Ag Leader® Technology

EDGE User Manual

Firmware Version 3.5

Ag Leader PN 4001662 Rev D

PN: 4001662 Rev. D

Table of Contents

General Content 1

Introduction and Company Profile 1
What's New in this Manual? 6
Conventions Used in this Manual 7
Cautions and Warnings 7
Cross-References and Web Links 7
Viewing this Manual Online 8
How to Find Information You're Looking For 9
Display Hardware 10
EDGE Installation Instructions 11
Mounting the EDGE Display 11
EDGE Mounting Components 12
EDGE Fuse Installation and Replacement 13
EDGE Screen Icon Conventions 14

Setup 15

System Functionality 15
Home Screen 16
Setup Screen 17
Management 18
Grower Management Tab 18
Importing an .MSF File 19
Season Management Tab 20
Field Management Tab 21
Field Management Tab - continued 22
Import and Export Boundaries 23
Boundary Import 23
Boundary Export 24
Console 25
General Tab 25
Memory Tab 26
Features Tab 27
Advanced Tab 28
Module Firmware Management 29
Field Notes 30

Start Field Operation 31
Run Time Environment: Map Screen 34
Title Bar 34
Task Bar Buttons 35
Map Screen Icons 37
Map Screen Status Items 39
Edit Legend 40
Create a Boundary 41
Start Boundary 41
Pause Boundary 42
View Boundary 42
View Map Markers 43
Summary 44
Select Summary 44
Diagnostics 45
Device Information 45
Memory 46
Display 46

GPS 47

GPS General Tab 47
OmniSTAR Settings 49
Serial Port Settings 50
GPS Diagnostics 52
GPS Information - First Screen 52
GPS Information - Second Screen 53
GPS Information - Third Screen 54
OnTrac2 Information 55
ParaDyme Information 56
NTRIP Information 57

Guidance 59

GPS Guidance Tab 59
Guidance Control 59
Pattern Files 60
Lightbar Settings 61
Guidance Functions 62
On-Screen Lightbar 62

On-Screen Lightbar (continued) 63
Guidance Screen 64
New AB Pattern 65
SmartPath 69
Creating a SmartPath Pattern 70
Select a Previous SmartPath Pass 72
Create an AB Line Within a SmartPath Pass 73
Choose Existing Lines Within SmartPath 74
SmartPath Guidance Options 75
Save Pattern 76
Reset Pattern 77
Load Pattern 78
About Guidance Patterns 80
A+ Pattern 80
Pivot 81
Adaptive Curve 84
Identical Curve 85
Guidance Options 86
Pause 86
Remark A 87
Shift 87
Adaptive Curve 87
Nudge 88
OnTrac2 89
OnTrac2 Setup Tasks 89
Vehicle Configuration 90
Edit Vehicle Settings 93
OnTrac2 Tools Tab 94
Calibrating OnTrac2 95
OnTrac2 Steering Diagnostics 99
Steering 99
Drive Unit 100
Status 100
Adjust Disengage Sensitivity 101
OnTrac2 Advanced Tab 102
Vehicle Database 102
Log Files 103
OnTrac2 Run Time Environment 104

Steering Adjustment....104
Steering Adjustment (continued)....105
Tuning....106
How the OnTrac2 System works....108

Tillage....113
Run Time Environment: Map Screen....113
Create a Tillage Configuration....114
Create a Configuration....114
Configuration Notes....114
GPS Offsets....115
Antenna Offsets....116
Hitch Tab Settings....117
Implement Offsets....118

Planting....119
Run Time Environment: Map Screen....119
Map Screen: Zoom to Extent....120
Map Screen: Zoom Detail....121
Planting Map Screen Items....122
Planting Setup Tabs....123
Create a Planting Configuration....124
Configuration Settings....125
Configuration Settings: Equipment Configuration....126
Equipment Configuration Settings - SeedCommand....126
Speed Input Settings....127
Calibrate Distance....127
Auxiliary Input Settings (Switch Mapping)....128
Add Auxiliary Input Settings....129
AutoSwath....130
AutoSwath Notes....131
Fixing Overplanting and Underplanting in AutoSwath....132
Vehicle Tab....133
GPS Offsets....134
Antenna Tab....135
Hitch Tab....136
Implement Tab....137

Implement Offsets 138
Section Offsets 138
Controller Tab 139
Controller Settings (SeedCommand) 140
Product Tab 141
Product Options 142
Add Product 143
Import Product 144
Product Settings 145
..... 145

Planting: SeedCommand™ Machine-Specific Setup 147

Map Screen: Zoom to Extent 148
Map Screen: Zoom Detail 149
Planting Map Screen Items 150
Run Time Environment: Rate Screen 151
Planting Rate Control Configuration Screen 152
Loading Prescriptions 153
Row Shutoff 154
Row Shutoff Configuration 154
Row Shutoff Look-Ahead Numbers 157
Checking AutoSwath Performance for Row Shutoff 158
If Gaps Appear on the On-Screen Map 159
Hydraulic Seed Rate Control 160
Hydraulic Seed Rate Control Configuration 161
Controller Settings for Hydraulic Seed Rate Motor Drives 162
Channel Tabs 162
Control Valve Settings - PWM 163
Control Valve Settings - Servo 164
Auxiliary Tab 165
Hydraulic Seed Controller Settings for Specific Planters 166
Hydraulic Seed Meter Calibration Numbers 167
Stepper Seed Rate Control 169
Stepper Seed Rate Control Configuration 170
Controller Settings for Stepper Seed Rate Motor Drives 171
Channel Tabs 171
Auxiliary Tab 172
Gear Ratio Calculations for Seed Rate Motors 173

Gear Ratio Drawing for Single Motor Drive 174
Gear Ratio Drawing for Multiple Drive Combinations 175
Seed Ratio Calculation Example Procedure: Multiple Drives..... 176
Gear Ratio Drawing for John Deere ProShaft™ Drives 177
Seed Ratio Calculation Example Procedure for Pro-Shaft™ Drives 178
Priming Seed Rate Meters 179
Calibrating Seed Rate Meters.....180
Calibrating Seed Rate Meters (continued) 181
Calibrating Seed Rate Meters (continued) 182
Troubleshooting 183
Zero Flow Offset Variation.....183
Stepper Seed Control Meter Alarms 186
Diagnostics.....187
Clutch Diagnostics (for Row Shutoff) 187
Input Diagnostics.....188

Application 189
Run Time Environment: Map Screen 189
Map Screen - Zoom to Extent.....190
Map Screen: Zoom Detail 191
Application Map Screen Items 192
Application Setup Tabs.....193
Create an Application Configuration 194
Configuration Settings 196
Configuration Settings: Equipment Configuration 197
Configuration Settings - Area Logging.....197
Edit Configuration Settings - Area Logging 197
Configuration Settings - DirectCommand 198
Configuration Settings - DirectCommand..... 199
Speed Input Settings 200
Calibrate Distance.....200
Auxiliary Input Settings 201
Add Auxiliary Input Settings 202
Fence Row Nozzle Indicators 203
AutoSwath 206
AutoSwath Notes 207
Vehicle Tab 208
GPS Offsets 209

Antenna Tab....210
Mount Tab....211
Hitch Tab....211
Implement Tab....212
Implement Offsets....213
Section Offsets....213
Controller Tab....214
Controller Settings (DirectCommand)....215
Product Tab....216
Product Screen....217
Product Settings....218
Product Options....219
Tank Mix Setup....220
Dry (Granular) Fertilizer Blend Setup....221
Miscellaneous Items....223
Fertilizer Default Product Settings....223
John Deere Specific Instructions....225
Control Valve Settings....227
Liquid Product Control Valve Configuration Options....227
Servo Control Valve Settings (By Manufacturer)....228
Control Valve Settings for Self-Propelled Sprayers....230
Liquid Servo Settings Description....237
Liquid PWM Control Valve Settings Description....238
Spinner Spreader Servo Settings Description....239
Spinner Spreader PWM Control Valve Settings Description....240
Spinner Speed PWM Control Valve Settings Description....241
Dickey John NH3 Conversions....242
Conversion Formulas....242

Application: DirectCommand™ Machine-Specific Setup....243
Map Screen: Zoom to Extent....244
Map Screen: Zoom Detail....245
Application Map Screen Items....246
Run Time Environment: Rate Screen....247
Target Rate....247
Rate Screen: Container Level....248
Tank Fill....248
Tank Empty....248
Tank Partial Fill....249

Adjust Container Amount 249
Tank Alarms 250
Container Alarm Screen 250
Rate Screen: Liquid Flow/Pressure 251
Rate Screen: Spinner Spreader Settings 252
Spinner Spreader Product Settings 253
Spreader Control 255
Application Rate Control Configuration Screen 256
Loading Prescriptions 257
Shape File Conversion 258
Liquid Application Control 261
Liquid Application Control Configuration 261
Liquid Application Controller Settings 268
Controller Settings - PWM 269
Controller Settings - Servo, Calibrated Reflow or Ramsey Valve 270
Direct Injection 271
Direct Injection Configuration Setup 271
Direct Injection Controller Settings 275
Priming an Injection Pump 276
Calibrating an Injection Pump 278
Injection Diagnostics 281
Spinner Spreader Granular Control 282
Spinner Spreader Control Configuration 282
Spinner Spreader Controller Settings 286
Controller Settings - Spinner Spreader 287
Controller Settings - PWM 288
Controller Settings - Servo 289
Fan Settings 290
NORAC UC5 Setup 291
Norac UC5 Setup Screen 291
Automatic Setup 292
Retune 292
Minimum Height Settings 293
Norac UC5 Run Time Environment 294
Boom Height Screen 294
Engage button 295
Boom Height Control Options 296
Troubleshooting 297

Troubleshooting DirectCommand Liquid Applications 297
Troubleshooting Direct Injection Configurations 301
Direct Injection: Pump Doesn't Run 302
Direct Injection: Pump Runs Full Speed 303
Direct Injection: Application Error 305
Direct Injection: Discharge Flow Sensor Error 306
Direct Injection: Inlet Restriction 307
Troubleshooting DirectCommand Granular Applications 308
Troubleshooting Serial Control Applications (Liquid and Granular) 309
Troubleshooting Serial Control Applications (Liquid Only) 310
Troubleshooting Serial Control Applications (Granular Only) 310
Miscellaneous 311
Glossary of Application Settings 311
Configuration Settings 311
Speed Input Settings 312
Automatic Swath Control Settings 312
Auxiliary Input Settings 313
Controller Settings 313
Controller Settings: Direct Injection Pump Calibration 315
Run Screen 315
Diagnostics 316
Input Diagnostics 316

Harvest 317
Run Time Environment: Map Screen 317
Map Screen: Zoom to Extent 317
Map Screen: Zoom Detail 318
Harvest Button on Task Bar 319
Map Screen: Flow Delay 319
Run Time Environment: Harvest Screen 320
Harvest Screen Display Items 321
Harvest Screen - Active Display Items 322
Harvest Setup Tabs 323
Create a Harvest Configuration 324
Configuration Settings 325
Primary and Backup Speed Source 325
Calibrate Distance 326
Combine Tab 327
Combine Settings 327

Advanced Combine Settings....328
Map Delays....328
GPS Offsets....329
Antenna Offsets....329
Head Offset....330
Header Tab....331
Header Settings....332
Calibrate Header Sensor....333
Header Offset....335
Crops Tab....336
Crop Settings....337
Calibration Tab....338
Pre-Harvest Checklist....339
Calibration Sequence....339
Vibration Calibration....340
Temperature Calibration....341
Moisture Calibration....342
Grain Weight Calibration....343
Adding a New Calibration....348
Diagnostics....351

Appendix....353
System Diagrams Reference....353
EDGE File Formats....354
Module LED Diagnostic States....355
Company Warranty Statement....356

General Content

Introduction and Company Profile

ABOUT US

Welcome to the Ag Leader Technology family. Ag Leader Technology, Inc. is the global leader in yield monitor and precision farming systems and is committed to meeting the present and future needs of the agriculture industry by providing high quality products and first class customer support.

INNOVATION

Ag Leader Technology manufactures and sells products which support a wide array of precision farming practices. These include grain and cotton yield monitoring, application rate control and monitoring, variable rate fertilizer application, site-verification, GPS guidance and interface to Autosteer technologies.

COMPATIBILITY

Ag Leader Technology offers compatibility and supports integration of many different types and brands of equipment used for precision farming. The latest equipment available is supported as well as older series of combines, planters, sprayers, tillage equipment, etc.

QUALITY AND SUPPORT

Ag Leader Technology continues to provide the best customer support in the industry. Precision farming doesn't come without questions. Ag Leader is committed to providing the most responsive, knowledgeable and friendly technical support available. Our technical support team is available seven-days-a-week during peak seasons to answer your questions on the operation of Ag Leader products.

WE WANT TO HEAR FROM YOU!

Feel free to call and discuss:

- Operational questions about the EDGE™ system
- Features you would like to see implemented to improve the system or features you would like to see added to the system to increase functionality

EDGE SYSTEM

Ag Leader's EDGE™ display provides an entry-level precision farming solution to meet the year round needs of today's precision farming operation. The EDGE™ display combines a greater level of simplicity with SeedCommand™, DirectCommand™ and yield monitoring capabilities to meet the year-round needs of today's precision farming operation.

The EDGE ™ display is a GPS-compatible universal monitor/controller for use in crop production and protection. It can easily be transferred between multiple vehicles through out the growing season to maximize your return on investment cost.

The display features a 6.5-inch color touchscreen in which users will find a greater level of simplicity combined with SeedCommand, DirectCommand and yield monitoring capabilities. The EDGE display is ideal for operations just getting started in precision farming, but also fits operations requiring multiple displays. Support for Ag Leader's AutoSwath feature make the EDGE display a great investment for any operation looking for an easy-to-use, input-cost saving solution.

The EDGE display has its own internal memory for recording GPS and logging all information collected during various field activities. No external data card is needed for in-field data collection.

The EDGE display has been built to withstand the harsh environment associated with today's agricultural industry. The weathertight enclosure is designed to seal out any dirt and moisture that is encountered during normal operating conditions.

	Note: The card door slot must be fully closed for the EDGE™ display to remain weathertight

SERVICE

There are no user-serviceable parts inside the EDGE display. Contact Ag Leader Technical Support for a Return Material Authorization (RMA).

ph: (515) 232-5363

fax: (515) 232-3595

e-mail: support@agleader.com

⚠CAUTION	*Note: This display has an internal lithium coin cell battery and an internal nickel metal hydride battery. There is a risk of explosion if either battery is replaced by an incorrect type. Dispose of used batteries according to the battery manufacturer's instructions.*

SYSTEM USES

- Grain yield monitoring
- Variety logging
- Liquid spray system control
- NH3 application control
- Granular and liquid fertilizer application
- Mapping tillage operations
- Mapping and logging product application
- Mapping of all field boundaries, sub-boundaries, waterways and terraces

	Note: For a complete description of all supported file format types and their uses, *See "EDGE File Formats" on page 354*

SYSTEM FEATURES

- 6.5" color display
- Sunlight-readable screen
- Large internal memory
- Rugged sealed enclosure
- Compatible with most NMEA GPS receivers
- DirectCommand product control using industry standard CAN-bus interface
- Adjustable volume control

DATA CARD USAGE

The EDGE uses a compact flash card for transferring data in and out of the display. The system is compatible with all current card sizes; 64 MB is the minimum recommended size for use with the system.

COLOR TOUCH SCREEN

The EDGE display features a 6.5-inch color touch screen display. The touch screen allows easy and intuitive navigation through the screens on the display without the need for any external keypad or mouse devices. Here are a few key things to remember if you are new to using a touch screen device.

- Do not use any sharp objects for running the touch screen device, this could result in damage to the display. Using the tip of a finger is the recommended method of operating the EDGE display touch screen.
- Do not use any harsh chemicals to clean the touch screen. Using a damp soft cloth or an anti-static wipe made specifically for cleaning computer displays is the correct way to clean the screen and the EDGE enclosure.
- The touch screen requires only a gentle touch of about half-second in duration to operate correctly. A common mistake new users make is to try to navigate too quickly through the system using firm taps instead of gentle presses on the display screen.

CAN-BUS TECHNOLOGY

The EDGE system uses Controller Area Network (CAN) technology. CAN systems are comprised of individual modules, each with their own high speed processor, connected through a high-speed communications cable. CAN has many benefits, including greater ability to configure and expand the system, compatibility, simpler installs with less wiring, and increased system dependability.

TECHNICAL SPECIFICATIONS

Do not exceed the specifications below:

- **Storage Temperature:** -30°C to +70°C.
- **Operating Temperature:** -10°C to +65°C
- **Operating Input Voltage:** 9 –16 V DC

⚠CAUTION	*Note: Exceeding these specifications may result in degraded operation and/or damage to the display.*

SYSTEM UPGRADES

Ag Leader Technology will periodically provide operating program updates that will improve the performance of your EDGE System. Required software updates will be available free of charge for download from www.agleader.com. On occasion, major releases will be made available that have significant product feature additions or enhancements. These optional software updates may have an additional fee associated with them.

PRODUCT REGISTRATION

When registering your Ag Leader Technology products by one of the following methods, you can elect to receive notice of any new product updates or features.

Register by mail: Ag Leader Technology

2202 South Riverside Dr.

P.O. Box 2348

Ames, IA 50010

Register by Fax: 515-232-3595

Register at the Ag Leader Web site at http://www.agleader.com

What's New in this Manual?

This EDGE User Manual supersedes the Version 3.0 edition of the EDGE User Manual, which was published in April 2010. As such, it has added information, including firmware upgrades that have been made in EDGE firmware version 3.5. You can quickly view some of these updates to this manual on the following pages.

GUIDANCE

- Added the SmartPath™ feature, which gives guidance from any previously-driven pass. For more information, *See "SmartPath" on page 69*, *"Creating a SmartPath Pattern" on page 70*, *"Select a Previous SmartPath Pass" on page 72*, *"Create an AB Line Within a SmartPath Pass" on page 73*, *"Choose Existing Lines Within SmartPath" on page 74*, and *"SmartPath Guidance Options" on page 75*.

PLANTING

- Changed appearance of Auxiliary Input Settings screen. See *"Auxiliary Input Settings (Switch Mapping)" on page 128*.

SEEDCOMMAND™

- The feature previously known as Clutch Control has been renamed Row Shutoff. Other than the terminology change, no functionality of this feature has changed for this firmware revision. For more information, see section beginning at *"Row Shutoff" on page 154*.

APPLICATION

- Added Flow Meter Logging support. See *"Create an Application Configuration (continued)" on page 195*.
- Changed appearance of Auxiliary Input Settings screen. See *"Auxiliary Input Settings" on page 201*.

DIRECTCOMMAND™

- Added Ramsey Valve to liquid product control configuration options. For more information, see *"Liquid Product Control Valve Configuration Options" on page 227* and also *"Controller Settings - Servo, Calibrated Reflow or Ramsey Valve" on page 270*.

Conventions Used in this Manual

Cautions and Warnings

The user manual uses the following text formatting schemes to call attention to information related to simplifying system operation and proper operating practices to prevent accidental data loss. If in doubt about the results of performing an action or deleting an item from the system, back up all system files to the external storage card prior to proceeding with the action.

Icon	Description
	Provides informative tips to assist with system setup, calibration, and operation.
	Indicates specific settings, calibrations, and procedures that must be followed for proper system performance and operation.
	Indicates specific instructions to avoid accidental loss of data and system configurations settings.

Cross-References and Web Links

Throughout this manual, numerous cross-references are provided to other pages or sections. These cross-references are always shown in blue, italic text; and list the title and page number as in the following example: To see how to view this manual online, go to *"Viewing this Manual Online" on page 8*. If you are viewing this manual in a .PDF format, you can click on this blue text and go directly to the link.

Links to web sites are shown in blue, italicized, and underlined text, as in the following example: To see the Ag Leader Technology Web site, go to this Web link: *www.agleader.com* .

Viewing this Manual Online

This user manual can be viewed online at Ag Leader's Web site. To view an online version, go to the Ag Leader Web site, and click the Support link. You should see a page titled "Manuals and Quick Reference Sheets."

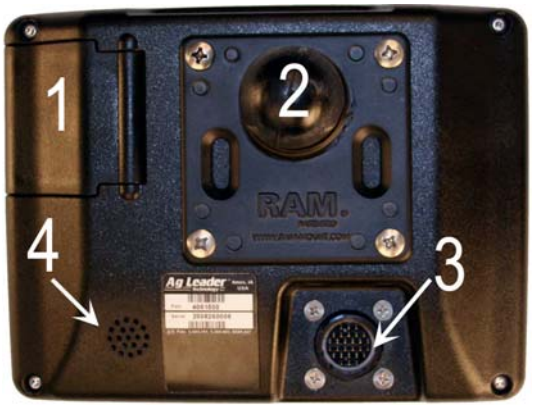
To view and/or print the EDGE User Manual online, you will need the Adobe Acrobat or Adobe Reader .pdf file format. The Adobe Reader software comes pre-installed on most personal computers. If Adobe Reader is not installed on your computer the program is available for download at no charge. A link to the Adobe download site is located at the Ag Leader Web site.

How to Find Information You're Looking For

What do you do if you cannot find the information that you're looking for? There are three different ways at your disposal to find specific information quickly. These steps can include:

1. Look up the information in the Table of Contents.
2. Look up the information in the section indexes that are located at the end of each manual section (Planting, Tillage, Application, and Harvest).
3. Use the Adobe Reader's search function. While viewing this manual online in PDF format, press the CTRL+F buttons on your keyboard. A search menu should appear, and from here, you may enter in a search term.

Display Hardware



EDGE Display - Back

EDGE Display - Front

Icon	Description
1 Compact Flash Card Slot	The compact flash card slot has a sensor that allows the display to know when the door is open or closed. If the door is opened when a card is in the display, an on-screen warning will appear indicating when the card can safely be removed. The EDGE display comes with a compact flash card. The compact flash card will be required to transfer files from the EDGE display to a desktop computer.
2 RAM Mount	For more information, *See "Mounting the EDGE Display" on page 11*
3 28-Pin Connector	The 28-Pin round connector contains CAN, RS-232 serial, and system power and ground connections.
4 Speaker	The built-in speaker is used for audible warnings. The speaker volume can be adjusted through the console setup routine.
5 Power/Reset Switch	The Power/Reset switch is used for turning the EDGE display on and off in installations where the system is connected to a continuous power supply. If the EDGE display ever stops responding, the manual power switch may be held in for five seconds to restart the system. Only do this as a last resort, data loss could occur during times of improper shutdown.

EDGE Installation Instructions

All machine installation and mounting kits are shipped with instructions specific to that kit. Instructions include special details relating to mounting, wiring and display configuration.

Mounting the EDGE Display

Mount the display to a secure support inside the vehicle cab. The following must be considered when choosing a mounting location.

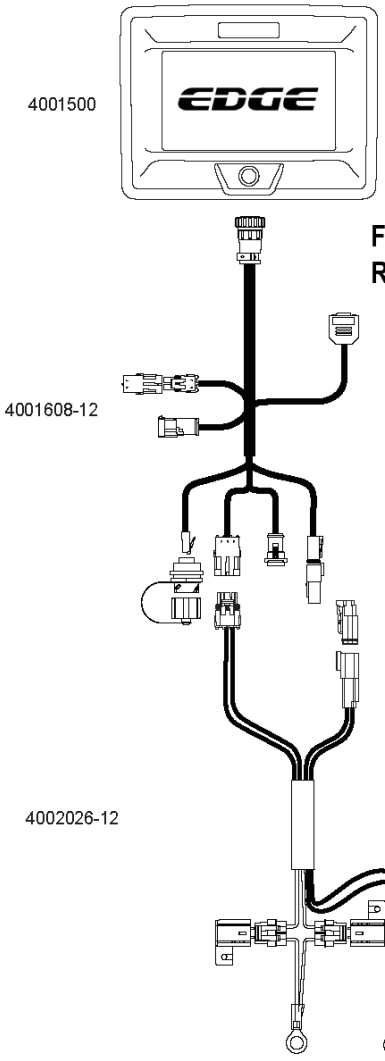
- The display must be readily accessible to the machine operator.
- The display must not obstruct the machine operator's normal driving view.
- The display must not interfere with or limit access to any of the existing machine controls.
- The EDGE CAN system cabling be routed and secured without interfering with existing machine controls.

⚠ WARNING	*If drilling holes is required during the mounting process, care must be taken to insure that damage is not done to existing vehicle wiring, mechanical, or cab structure. Refer to vehicle manufacturer documentation for specific details on your equipment. Follow all OEM instructions, cautions, and warnings when working around equipment.*

EDGE Mounting Components

Callout Number	Description and Part Number
1	RAM Base, PN 4000280
2	RAM Arm - 5”, PN 4000279
3	2”X6” Base, PN 400187

EDGE Fuse Installation and Replacement

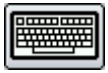
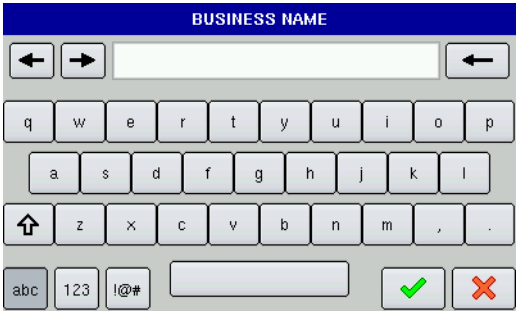
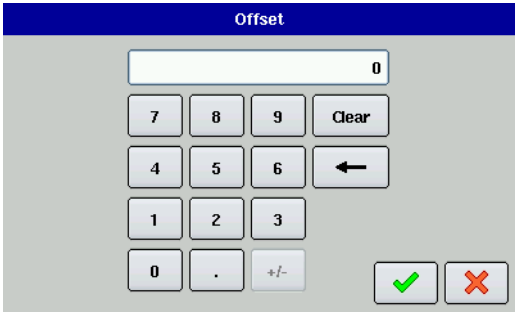


Fuse Type: Blade Style (ATO/ATC)
Rating:
Fuse Holder (orange wire) 5A, 250 VAC
Fuse Holder (pink wire) 15A, 250 VAC

⚠ CAUTION	*Note: The fuse is to be placed in the fuseholder in-line with the battery power cable and used with display only.*

EDGE Screen Icon Conventions

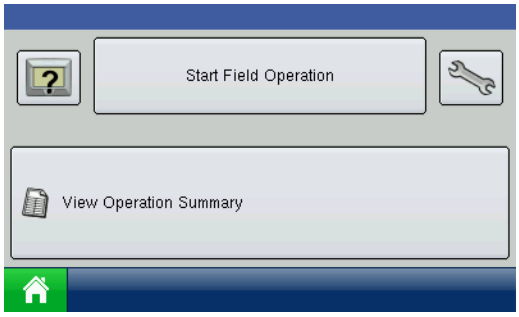
The following control buttons are made available for entering names and calibration values into the EDGE system.

Function Button	Data Entry Screen
 An on-screen Keyboard is made available when appropriate for use during all setup processes. Press the keyboard button to access the on-screen text entry screen shown at the right.	
An on-screen Numeric Keypad is made available for changing configuration settings and calibration numbers. Press the keypad button to access the on-screen numeric entry screen shown at the right.	

Setup

System Functionality

Prior to setup, most of the functionality of the EDGE system is not available until the basic setup process is completed, and the Home screen will look like the picture below. The Run Time Environment is not accessible, because the Map button does not appear on the task bar at bottom.

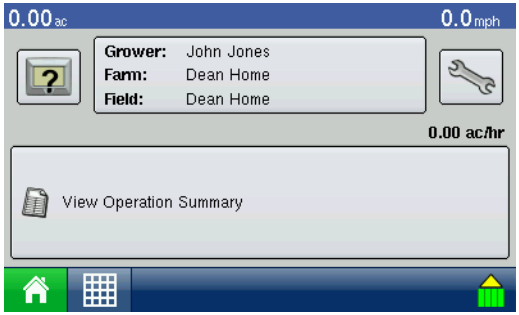


You must complete these initial configuration steps for the Run Time Environment to be active:

1. Grower, Farm, and Field management. For more information, *See "Management" on page 18.*
2. Equipment Operating Configuration. For more information, see the configuration information described in each Operations chapter (for example, Planting, Application, Tillage, etc.).
3. Product setup. For more information, see the configuration information described in each Operations chapter.
4. Start Field Operation. For more information, *See "Start Field Operation" on page 31.*

Home Screen

After a Grower, Farm and Field has been selected, the Home screen will appear as shown below. Specific functions available at the Home screen are described in the table below.



Button	Description
	The Diagnostics button opens screens that display Device Information, Memory, Display, and module diagnostics. For more information, *See "Diagnostics" on page 45.*
	The Start Field Operation button, the top center button which shows the Grower Farm and Field, opens the Field Operation Wizard where you can enter information relating to your Growing Season, Grower, Farm, Field, Crop Type and Product. For more information, *See "Field Notes" on page 30.*
	The Setup (wrench) button opens the Setup screen. For more information *See "Setup Screen" on page 17.*
	The View Operation Summary button opens the Select Summary screen, where you can select different configuration settings for Seasons, Grower, Farm, Field, Operations, and Product. For more information, *See "Summary" on page 44.*

Setup Screen

The Setup Screen is where you can access management information, adjust console and GPS settings, and specify field operations. Begin by going to the Home Screen, and pressing the Setup (wrench) tool. The Setup Screen appears, as shown below.

Press the Management button, and the Management tabs appear. These are described on the following pages.

Management

The Management tabs, which are accessible from the Management button on the Setup screen, include Grower, Season and Field.

- For information on the Season Tab, *See "Season Management Tab" on page 20.*.
- For information on the Field Tab, *See "Field Management Tab" on page 21.*

Grower Management Tab

The Grower is a global setting that refers to the business or person the system is in operation for. Contact information can be added for each grower. The Grower information will be passed into mapping software for automatic Grower setup within desktop software.

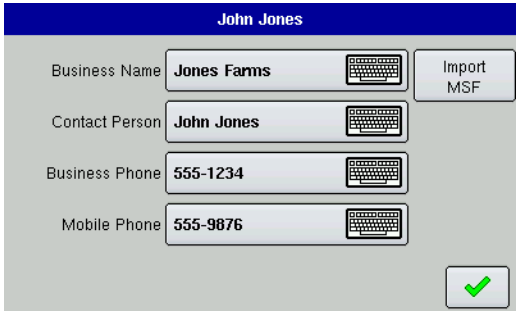
- Press the Add (plus sign) button to add a Grower.
- Press the Delete (minus sign) button to delete a Grower.
- You may edit an existing name of a Grower by highlighting that name and pressing the on-screen keyboard.
- Press the Wrench Button to add or edit information for a **Contact Person**, **Business Phone**, **Mobile Phone**, or import an .msf file. For more information on adding an .msf file, *See "Importing an .MSF File" on page 19.*

Importing an .MSF File

A Management Setup File (.msf) is a file format that allows the EDGE display to import Grower and Field information from desktop software via a Compact Flash Card. Follow the process outlined below to import desktop software information from your Compact Flash Card.

	Note: When importing management items from an .MSF setup file, the imported data will always update or be added to existing management data and will not overwrite it.

1 In the Grower Tab, press the Wrench Button. A screen opens, showing the name of that Grower in the Title Bar, as shown below.



2 Press the **Import MSF** button, and the File Selection screen appears, as shown below. (Be sure that your Compact Flash Card is already placed in the EDGE display)

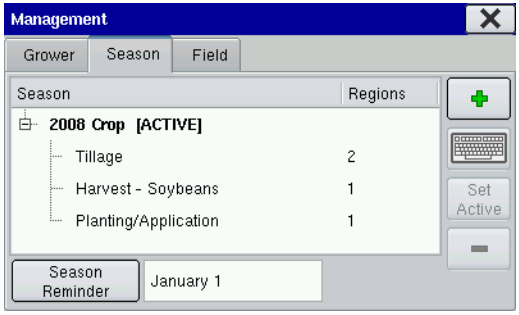
Importing an msf File - continued

3 Open this folder by pressing the Plus sign to the left of the folder. Highlight the desired .msf file and press the checkmark box.

4 The .msf file now appears under the Grower Tab on the Grower list.

Season Management Tab

A season is defined as the calendar year that the crop will be harvested. Creating a season and setting it to active is required prior to the system logging any data.

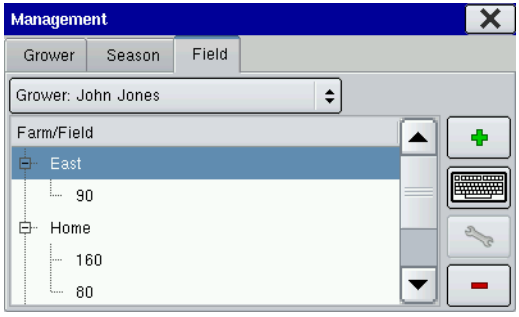


The seasons are displayed in lists, with the Active season displayed in bold face type. All new data is logged to the active season; therefore a season must be set as Active before you can log any new data to it.

- Press the Add (plus sign) button to add a Season.
- Press the Delete (minus sign) button to delete a Season.
- You may edit an existing name of a Season by highlighting that name and pressing the on-screen keyboard.
- Press the **Set Active** button to set the season selected in the Summary list box to the active season.
- Press the **Season Reminder** button to set the date that the system will prompt the user to create a new season.

Field Management Tab

A field consists of one or more outer boundaries. Each outer boundary can contain one or more inner boundaries used to define any combination of roadways, waterways, building sites, or bodies of water. If the display will be used for multiple Growers, enter each Grower business name and associate the field names with the correct grower when the fields are setup within the system.

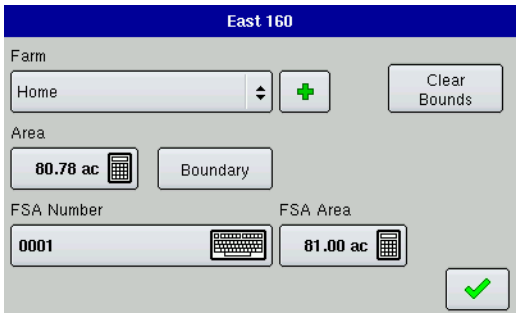


In the Field Tab, select a Grower underneath the drop-down menu at the top. Each farm of that particular grower is shown in a list, with the fields within that farm as subcomponents within that list.

- Press the Add (plus sign) button to add a Field.
- Press the Delete (minus sign) button to delete a Field.
- You may edit an existing name of a Field by highlighting that name and pressing the on-screen keyboard.

Field Management Tab - continued

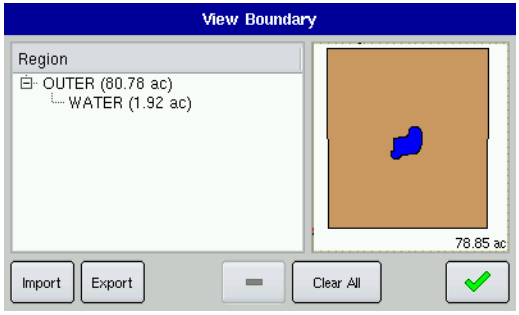
- Press the Wrench Button to add or edit information regarding that field and its boundary. The Field Information screen opens, showing the name of that field in the Title Bar. The example below shows the “160” Field of the “Home” Farm.



- **Farm** - Name of farm.
- **Area** - Total acres of farm.
- **Clear bounds** - Press the **Clear Bounds** button to center the map on the current GPS position. This is particularly useful if you have flyer points or have logged a point outside the mappable range of your current location.
- **FSA Number** - The U.S. Farm Service Agency’s four-digit number assigned to every farm.
- **FSA Area** - Tillable acres as established by the FSA.
- **Boundary** - Press the **Boundary** button to import and export boundaries. A detailed explanation is described on the following pages.

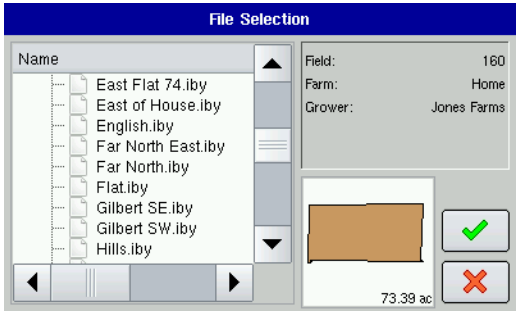
Import and Export Boundaries

Boundaries can be created with the EDGE display or imported from desktop GIS software. For more information on creating boundaries, see *"Create a Boundary" on page 41*. Any boundary files present in the EDGE display can also be exported for use in desktop mapping software. Begin by pressing the **Boundary** button on the Field Information screen, which can be viewed after pressing the Field Tab's Wrench Button button. The View Boundary screen appears, as shown below.



Boundary Import

1. To import a boundary from the external data card, press **Import**. The File Selection screen appears, as shown below.



2. Select the desired file to import.
3. Press the checkmark box on the File Selection screen to complete the import process.

Boundary Export

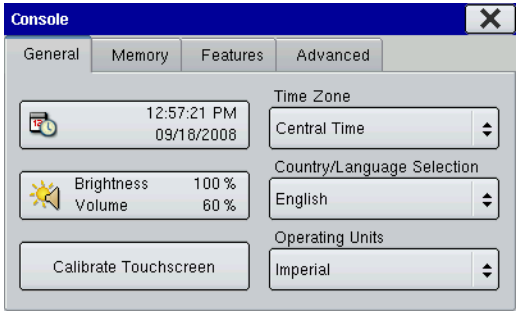
1. To export a boundary to the external data card, press **Export**.
2. A screen appears, telling you that the boundary was exported successfully. Press the checkmark box.

3. Press the checkmark box on the View Boundary screen.

Console

The Console screen contains settings related to Time, Date, display console screen settings, operating units and external card information. To go to the Console screen, press the Console button on the Setup screen. The Console screen consists of four tabs: **General**, **Memory**, **Features** and **Advanced**.

General Tab



The General Tab consists of the following items:

- **Time and Date settings.** To change these, press on this button and use the up and down arrow keys to adjust the hours, minutes, A.M./P.M. settings, month, date and year. To make these changes effective, press the checkmark/ Shutdown button.

	Note: The EDGE display will then shut down immediately. If you do not want to shut the monitor down, press the Close (Red X) button.

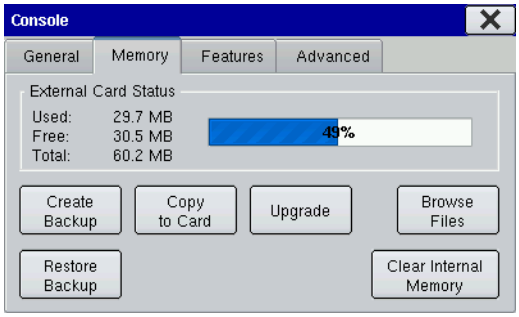
- **Brightness and volume percentages.** To change these, press the Brightness/Volume button and use the up and down arrow buttons to change the percentage of the Display Brightness and Speaker Volume.
- **Calibrate Touchscreen.** Press this to launch the Touch Screen Calibration wizard. Calibrate the touch screen by following the on-screen instructions.
- **Time Zone.** Use the drop-down menu to select your time zone.

General Tab (continued)

- **Country/Language Selection.** Use the drop-down menu to select the language.
- **Operating Units.** Select either Imperial or Metric.

Memory Tab

The Memory Tab displays the used and free space available on the external data card, as well as the percentage of memory used on that card.



The Memory Tab also includes the following items:

- **Create Backup.** Press to create a backup file of all configuration settings, products, and Grower-Field Management data structure on the external memory card. Backup files are stored using the .ibk file format.
- **Restore Backup.** Press to restore a backup file from the external data card to the internal memory of the EDGE monitor.
- **Copy to Card**. Copies files which have not yet been copied to the external storage card. (Log files are stored using the .ilf file format).
- **Upgrade.** Press to load program upgrade files from the external storage card in order to upgrade the display and modules.
- **Browse Files.** Press to view all files on the external memory card.

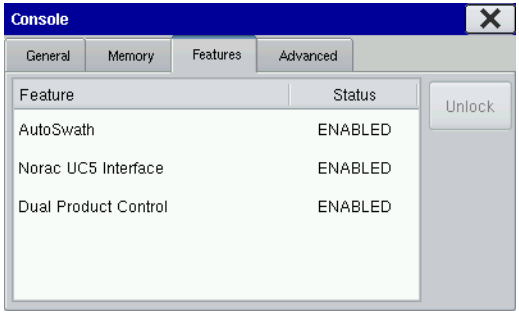
Memory Tab (continued)

- **Clear Internal Memory.** Press this button to clear the internal memory of the monitor. The system will present a warning dialog box and ask if you would like to create a backup file prior to clearing the memory.

⚠ CAUTION	*Note: The EDGE monitor will be returned to a "new out-of-box" unconfigured state when the memory is cleared.*

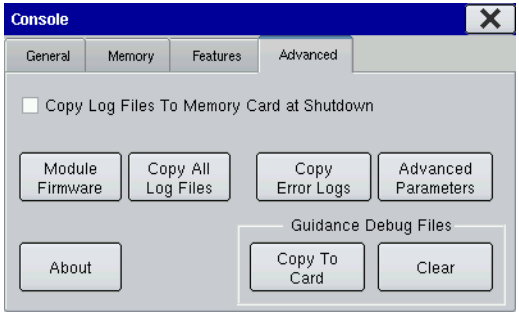
Features Tab

Unlock codes are unique to the serial number of each EDGE display and the feature registration number. You must supply these numbers to your Ag Leader dealer when purchasing any unlock codes. Press the **Unlock** button, and the Feature Registration box appears. Use the on-screen keyboard to enter the unlock code and press the checkmark box to enable the feature. This feature then appears and the status is shown as "Enabled", as in the picture below.



ℹ	*Note: Once a feature is unlocked, that feature remains with that display and cannot be transferred to another.*

Advanced Tab



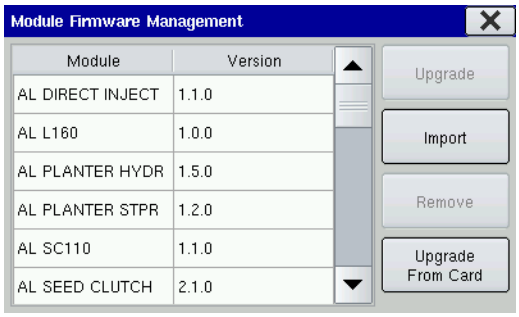
The Advanced Tab contains the following functions of interest to most EDGE users:

- **Copy Log Files to Memory Card at Shutdown** - Checking this checkbox will copy all log files to the external memory card when the EDGE display is turned off.
- **Copy All Log Files.** Press to copy all logged data in the display to the external storage card.
- **About** - Displays product licensing information and copyright information.
- **Module Firmware Management**. Displays a list of all firmware modules and firmware versions that are available for the EDGE display. For more information, *See "Module Firmware Management" on page 29.*.

⚠CAUTION	*Note: The Advanced Parameters, Copy Error Logs, Guidance Debug Files (Copy to Card, and Clear) functionality is reserved for use by Ag Leader. Do not change any of these settings without specific instruction from Ag Leader Technical Support.*

Module Firmware Management

The Module Firmware Management screen displays a list of all firmware modules and firmware versions that are available for the EDGE display.



	Note: The Module Firmware Management list includes module firmware that you may not be running.

- **Upgrade** - Makes necessary upgrades to all the modules' firmware while the display's firmware is upgraded.
- **Import** - Imports any firmware stored on the Compact Flash Card into the display memory.
- **Remove** - Removes unwanted module firmware from the Module Firmware Management list.

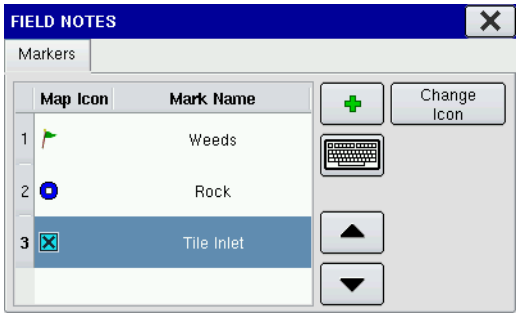
	Note: Pressing the Remove button does not remove firmware from the module itself. It merely removes the upgrade file from the display.

- **Upgrade from Card** - Upgrades an individual module directly from the Compact Flash Card.
-

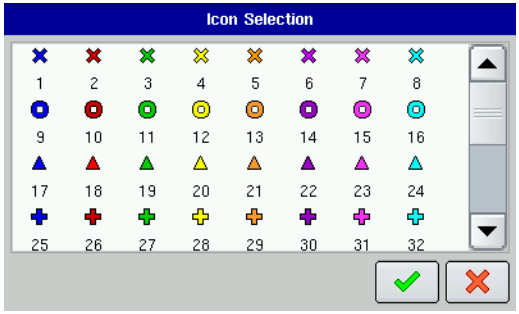
Field Notes

Markers are a collection of point objects shown as icons on the Map Screen. As the name suggests, markers allow the operator to mark mapping points “on the go” and thus identify specific features within a field.

You can create markers by pressing the Field Notes button on the Setup screen. The Field Notes screen opens, as shown below.



- Add - Press the Add button to add a Field Note. This marker then appears on Map Options at the Map screen. For an example, *See “View Map Markers” on page 43.*
- Keyboard button - Press the on-screen keyboard button to edit the marker name.
- Up and down arrow buttons - Press the up and down arrow buttons to rearrange the order of the map icons.
- **Change Icon** button - Opens the Icon Selection screen, as shown below, where you can change the appearance of a map icon.



Field Notes (continued)

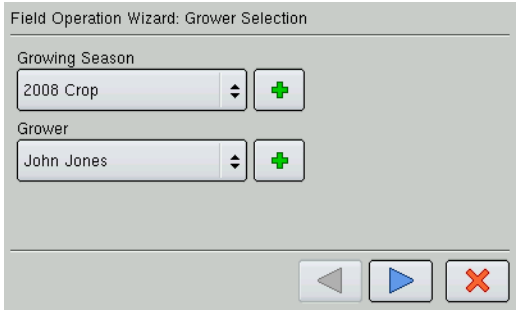
	For information on viewing the Field Notes on the Map Screen, See "View Map Markers" on page 43.

Start Field Operation

You can start field operations after setting up a Grower, Farm and Field; and then creating an operating configuration.

- To set up a **Planting** Operating Configuration, *See "Create a Planting Configuration" on page 124.*
- To set up a **Tillage** Operating Configuration, *See "Create a Tillage Configuration" on page 114.*
- To set up an **Application** Operating Configuration, *See "Create an Application Configuration" on page 194.*
- To set up a **Harvest** Operating Configuration, *See "Create a Harvest Configuration" on page 324.*

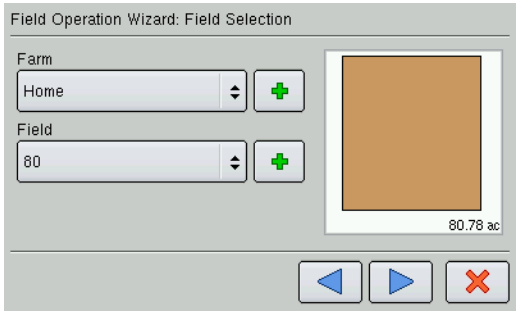
After creating an operating configuration, begin by returning to the Home screen. To Start Field Operations, press the Start Field Operation button. The Field Operation Wizard appears, as shown below. Follow the steps in the Wizard to select an operating configuration.



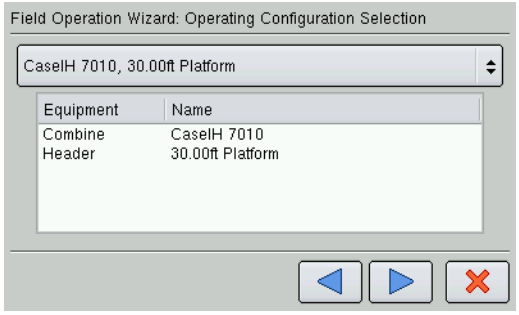
Start Field Operation (continued)

1 **Grower Selection.** Enter a **Growing Season** and **Grower** either by using the drop-down arrows to select existing ones, or by pressing on the Add (plus sign) arrow to create new ones. Press the blue right-arrow key at the bottom of the screen to proceed to the next step.

2 **Field Selection.** Add a **Farm** and **Field** either by using the drop-down arrows to select existing ones, or by pressing on the **Add** (plus sign) arrow to create new ones. Press the blue right-arrow key at the bottom of the screen to proceed to the next step.



3 **Operating Configuration Selection**. Use the drop-down arrow to select a configuration. Press the blue right-arrow button to continue.



Start Field Operation (continued)

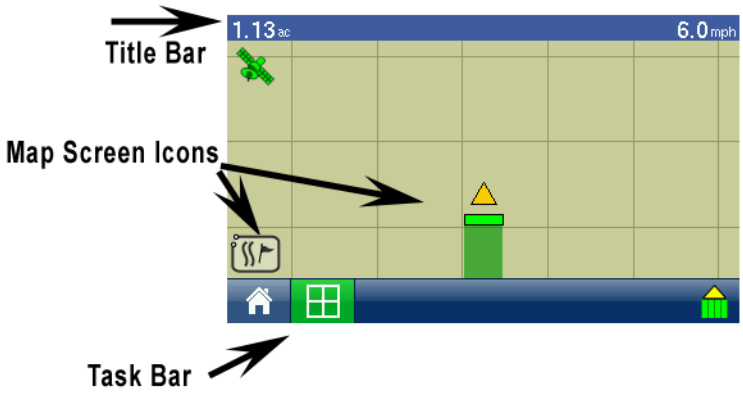
4 **Product Selection.** Users creating Field Operating Configuration in either Planting or Application must select a product from the drop-down list. Press the blue right-arrow button to continue. At the Options screen, enter in a Controlling Product and Units.

	Note: If you are selecting an Application product, you may check the box marked Show Only Tank Mixes and Blends at the Product Selection Screen. If this box is checked, the display will only allow the selection of tank mixes that were previously set up.

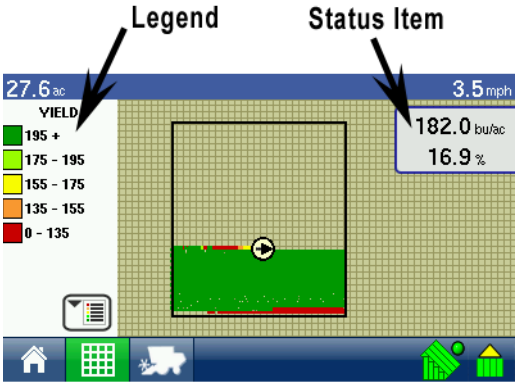
5 When you complete the steps in the Wizard, you will return to the Home Screen.

Run Time Environment: Map Screen

The appearance of the map screen varies, depending upon which operation you are performing. As examples, typical map screens for Tillage and Harvest are shown below. Data shown at the Title Bar at the top of the Map Screen show speed and distance logged. Icons on the Map Screen itself indicate features pertaining to the specific operation you are viewing at the map screen. Buttons on the Task Bar at the bottom of the map screen show all operations that you are currently performing.



MAP SCREEN - TILLAGE (ZOOM DETAIL)



MAP SCREEN - HARVEST (ZOOM TO EXTENT)

Title Bar

The Title Bar shows current speed in miles per hour (kilometers per hour) and area logged.

Task Bar Buttons

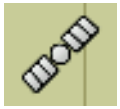
The task bar displays buttons relating to various functions of the EDGE monitor. These buttons include Home, Mapping, Liquid Rate Control, Planting Rate Control, Harvest, Autoswath, and Logging. These buttons are shown in front of a green background when you are at that screen; otherwise they are shown in front of a blue background. Examples are shown in the following table.

Button	Description
	Home Button. Pressing the Home button takes you to the Home screen.
ZOOM DETAIL **ZOOM TO EXTENT** **PERSPECTIVE VIEW**	**Map Button**. Pressing the Map button takes you to the Map screen. Pressing it more than once cycles the Map screen to zoom in and out. *Note: The Perspective View is only available when guidance is active.*
	Rate Control Button. Pressing this button takes you to the Rate Control screen, which is shown for both Planting and Application.
ON **OFF**	**AutoSwath Button**. Pressing this button turns the AutoSwath feature on and off. When AutoSwath is on, the icon is green; when it is off the icon is white.
ON **OFF**	**Logging Status Button**. Pressing this button turns logging on and off.

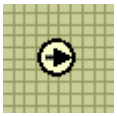
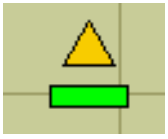
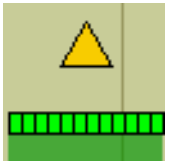
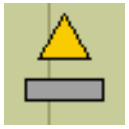
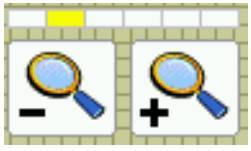
Task Bar Buttons (continued)

Button	Description
NORAC Engage - Enabled **NORAC Engage - Disabled**	The NORAC Engage button enables boom height control. This button can toggle back and forth between Automatic Mode and Manual Mode. • When you enable Automatic Mode, this button turns green and an arrow appears above the triangle. At the same time, the EDGE display beeps three times. • When you disable Automatic Mode on any part of the boom and the display switches to Manual Mode, this button turns grey and the EDGE display beeps twice. If less than the full boom remains in Manual Mode, the EDGE will continue beeping twice every three seconds.
Master Switch - ON **Master Switch - OFF**	The Master Switch Indicator, shown for SeedCommand or DirectCommand functions, shows if the master switch is on (green) or off (red). The master switch is shown in the **F1** position on the Auxiliary Input Settings screen.

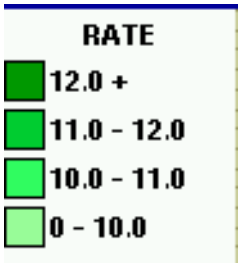
Map Screen Icons

Icon			Description
Differential GPS	**GPS - No differential**	 **No GPS**	The GPS button in the upper left-hand corner of the Map screen, displays the following colors: • Green if you are receiving a differential GPS signal • Yellow if you are receiving GPS, but no differential signal • Grey if you are receiving no GPS signal.
Engage - On	**Engage - Ready**	**Engage - Off**	The Engage icon shows that the OnTrac2 autosteer system is on, off, or off but ready to engage. The appearance of this icon displays the following: • Green if the autosteer system is on. • Grey if the autosteer system off but ready to engage. • Grey with a red circle and slash if the autosteer system is off and unable to engage. For more information, see the Guidance chapter at *"Guidance" on page 59*.
			The Map Options icon is used for numerous purposes. With this button, you can create boundaries or place Field Markers. For more information, see *"Create a Boundary" on page 41* and *See "View Map Markers" on page 43.*
Display Legend Icon - Off		**Display Legend Icon - On**	The Display Legend icon shows the Rate Display. • If off, the Display Legend icon appears with the arrow pointing to the top and a grid within its border. • If on, the Display Legend icon appears with the button pointing down and no grid within its border.

Map Screen Icons - continued

<table>
<tr><th colspan="3">Icon</th><th>Description</th></tr>
<tr><td colspan="3"> 
Vehicle Icon - Zoom to Extent</td><td rowspan="2">The Vehicle Icon is shown by an arrow inside a circle if the Map Screen is viewed in Zoom to Extent.
The vehicle appears as a gold-colored triangle if the Map Screen is viewed in Zoom Detail. The appearance of the zoomed-in icon changes depending upon the data being logged in the field. The Zoom Detail changes the Map Screen's appearance so that the vehicle icon is always shown pointed to the top.
• If the vehicle is logging, the implement icon appears as a green bar behind it, as shown at far left.
• If the vehicle is logging data from an implement split into sections, (for instance during a planting or application operation), then these sections appear in the implement icon. For an example, see the middle picture.
• If the vehicle is not logging data, then the implement icon appears as a grey bar, as shown at the picture at right.</td></tr>
<tr><td> 
Vehicle Icon - Logging</td><td> 
Vehicle Icon - with sections</td><td> 
Vehicle Icon - Not logging</td></tr>
<tr><td colspan="3"> </td><td>Press the center of the Map Screen, and four arrow icons appears around the vehicle icon. An example of one of these arrow buttons is shown at left. Pressing these arrow icons will move the center of the Map Screen in the direction of the arrow button.</td></tr>
<tr><td colspan="3"> 
Zoom tools</td><td>The Zoom Tool icons, which resemble a magnifying glass, are shown at the bottom right-hand side of the Map Screen. Pressing the zoom tool with the plus sign increases the scale of the Map Screen; pressing the zoom tool with the minus sign decreases the scale of the Map Screen.</td></tr>
</table>

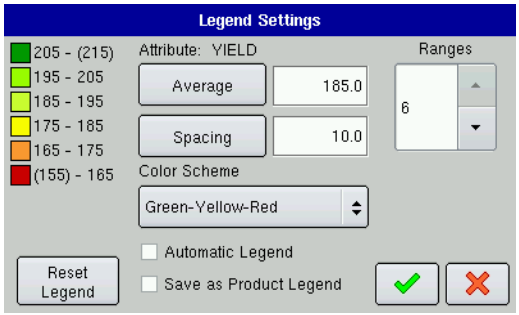
Map Screen Status Items

Status Item	Description
	The Legend is shown on the left-hand side of the Map Screen. This legend is shown for Application, Planting and Harvest operations. The colors and rate increments of the Legend can be adjusted. For more information, *See "Edit Legend" on page 40.*

Edit Legend

By pressing on the Legend, the Legend Settings screen appears, as shown below. The Legend Settings screen allows you to change the default legend for the rate applied.

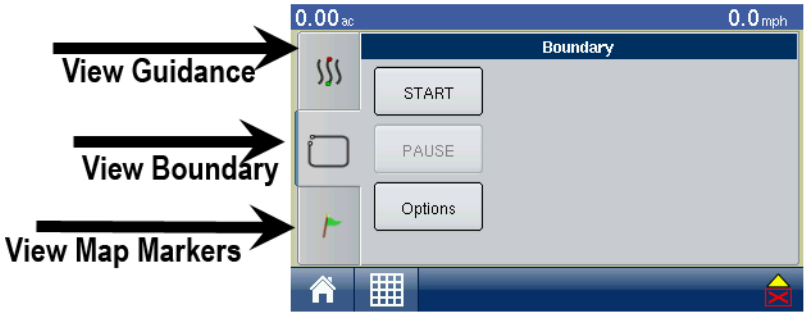
	Note: Legend settings changes that are made at this screen will affect all regions.



- **Attribute.** Attributes shown for Harvest include **Yield** and **Moisture**. The **Rate** attribute is shown for Planting and Application operations.
- **Average**. The **Average** button changes the average rate for the legend.
- **Spacing**. The range **Spacing** button changes the difference between the rates in one color range.
- **Ranges**. The Ranges up and down arrow buttons change the number of range increments displayed in the legend.
- **Color Scheme**. The color scheme can be modified by using the drop down list.
- **Reset Legend**. Resets the legend to the default settings.
- **Automatic Legend**. If the **Automatic Legend** checkbox is selected, the average automatically sets itself to the field average and updates as the field average changes
- **Save as Product Legend**. Select the Save as Product Legend checkbox if you wish to set the current legend as the default legend for all regions of the same product.

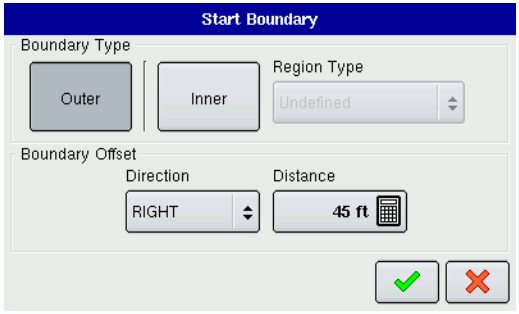
Create a Boundary

To begin creating a Map boundary, press the Map Options icon on the Map Screen. The Boundary Creation screen appears, as shown below.



Press the **Start** button to start creating a boundary. The Start Boundary screen appears, as shown below.

Start Boundary



1 You can create two types of Map Screen boundaries in the EDGE display: Outer boundaries delineate the borders of an entire field; inner boundaries mark specific features within that field, such as waterways or buildings. Choose whether to create either an Outer boundary or Inner boundary by pressing one of the two Boundary Type buttons.

Start Boundary (continued)

2 If you are creating an Inner Boundary, choose either **Roadway**, **Body of Water**, **Waterway**, **Buildings** or **Undefined**.

3 The Boundary Offset feature enables mapping a boundary at a user-defined distance to the left or right of the GPS antenna centerline. If desired, specify a Boundary Offset distance by choosing a direction and distance from the GPS antenna centerline.

4 Press the checkmark box to start the boundary.

Pause Boundary

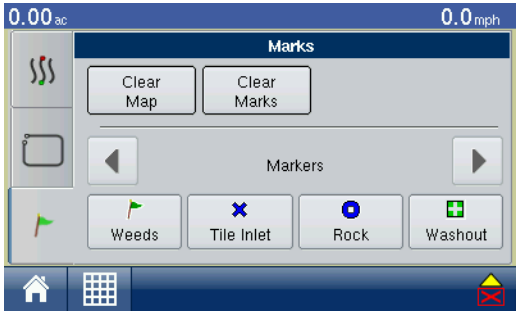
When creating a boundary, you can use the **Pause Boundary** button to create a straight line between two points. To do this, drive the vehicle to a point, press the **Pause Boundary** button, then drive to the second point. When you resume boundary creation, a straight line is created between your current point and your pause location.

View Boundary

At the Boundary Creation screen, you can press the **View** button to open the File Selection screen, where you can view all field boundary information.

View Map Markers

Pressing on the View Map Markers button on the Create Boundary screen cycles this screen to the Map Markers screen, as shown below. The Map Markers screen shows all of the Markers that you created in *"Field Notes" on page 30*.

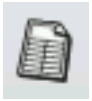


	Note: If all of the Markers that you created are not immediately visible in this screen, use the up and down arrows on the right-hand side to view more markers that you created.

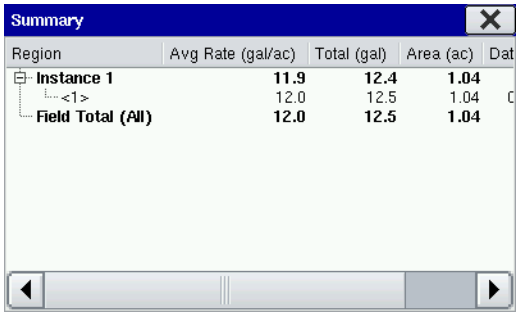
- Press an individual marker to indicate a Field Note on the Map Screen.
- Press **Clear Map** to permanently remove all logged data from the active field operation.
- Press **Clear Marks** to permanently removes all mapped marks from the active field.

	Note: For an explanation of the View Guidance screen, See "Guidance Functions" on page 62.

Summary

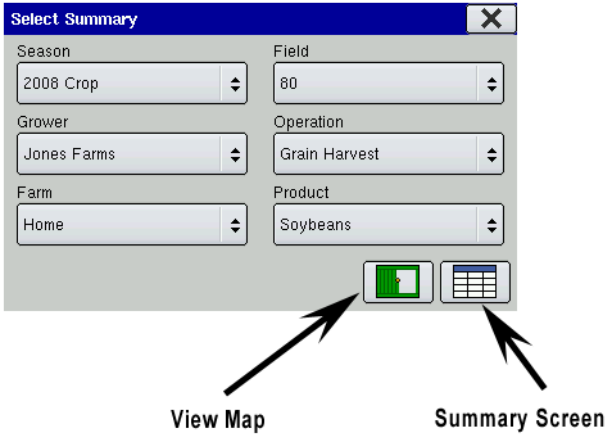


Press the Summary button at the bottom of the Home Screen to view a summary information, which shows you field totals and averages for a specific field. If you have performed only one instance in a specific field, the Summary Screen appears, as shown below. Use the bottom scroll bar to view all data for a particular field.



Select Summary

If you have performed more than one operation for a field, the Select Summary Screen appears, as shown below. Use the center-right drop-down menu to choose the Operation that you wish to view. Press the Summary Screen button at bottom right to view the Summary Screen. Press the View Map button to view a Summary Map.



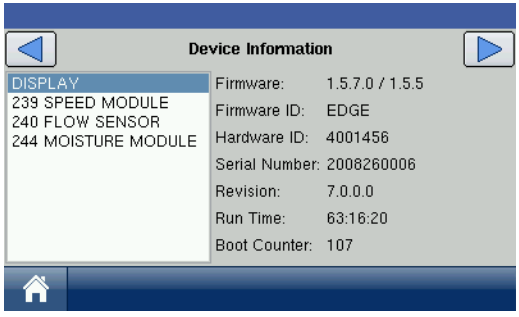
Diagnostics

Pressing on the Diagnostics button on the Home Screen summons the Diagnostics screens that pertain to your configuration. Technical support may request that you look at these screens for help in diagnosing a problem. Three screens that appear for all configurations include Device Information, Memory and Display, which are described in the following section. Additional screens, appropriate to the connected modules, are present as needed.

	GPS Diagnostic information can be found at *"GPS Diagnostics" on page 52*

Device Information

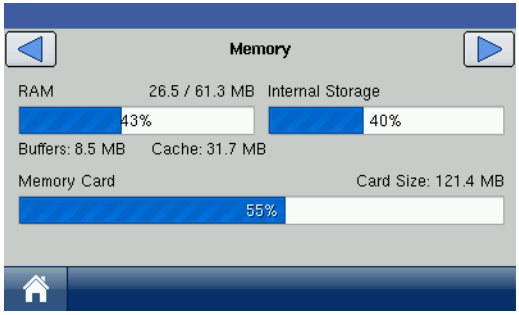
The Device Information screen shows generalized diagnostic information, including Firmware information, Hardware information, Serial Number, Revision Number, Run Time, and Boot Counter.



Additionally, the CAN Device List on the left-hand side of this screen displays the modules that are connected to the CAN Bus. Select a device to display specific details in the Firmware and Hardware Information frames of the CAN tab. Check the CAN device list to ensure that all modules appear there.

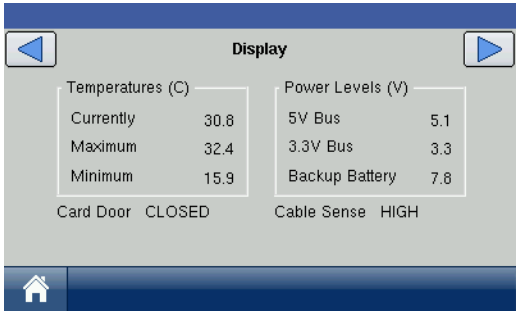
Memory

The Memory screen shows information about memory usage, both for the display as well as an external memory card.



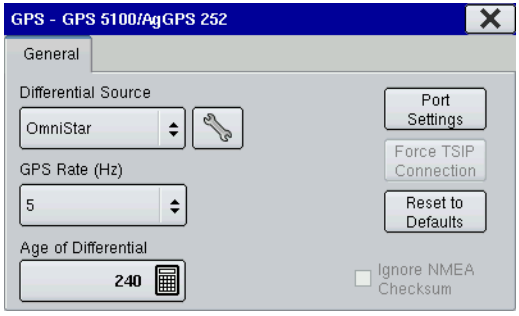
Display

The Display screen shows generalized diagnostic information about the EDGE display, including display temperature, as well as display and CAN Bus voltage.



GPS

During your field operation, the GPS button in the upper left-hand side of the Map Screen should appear as green, which means you are receiving a differential GPS signal. If this icon appears yellow, you are still receiving GPS but are not receiving a differential signal; and if it appears gray then you have lost GPS. In either case, you should check your GPS settings. At the Home screen, press the Wrench Button to go to the Setup Screen. Press the GPS button, and the GPS General Tab appears, as shown below.



GPS General Tab

- **Differential Source** - Select choice of WAAS/EGNOS, Satellite (OmniSTAR®) or Beacon (Coast Guard) differential sources.
- **Wrench Button** - Pressing the Wrench Button opens different settings screens, depending on whether you are using OmniSTAR® or Beacon.
  - If using OmniSTAR, see *"OmniSTAR Settings" on page 49*.
- **GPS Rate (Hz)** - The GPS Position Rate drop-down menu represents the cycles per second that the display receives guidance information from viewable satellites. Select one of the available Hz rates from the drop-down menu.

GPS General Tab (continued)

- **Age of Differential** - Displays the elapsed time since reception of last differential correction signal. The Age of Differential button is only functional when GPS is connected.

- **Port Settings** - Displays the Serial Port Settings screen, where you can adjust GPS output. For more information, *See "Serial Port Settings" on page 50.*

- **Force TSIP Connection** - Forcibly connects to TSIP GPS receiver. Pressing this button will force the port to TSIP communication.

	Note: This button is functional only if the TSIP GPS receiver is physically connected.

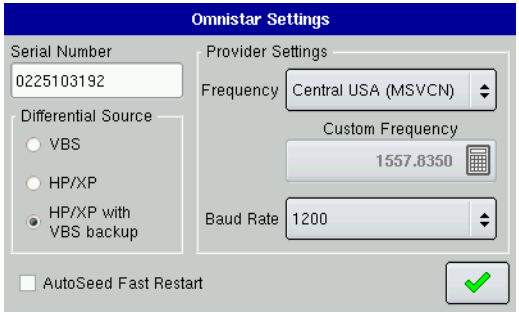
- **Reset to Defaults** - Press the Reset button to restore TSIP receiver settings to the factory default. This will remove all custom TSIP settings.

	Note: Differential settings and NMEA messages will need to be configured for the system to function properly after resetting factory defaults.

- **Ignore NMEA Checksum** - Check this to ignore intermittent GPS message errors.

OmniSTAR Settings

Pressing the Wrench Button on the GPS General Tab opens the OmniSTAR Settings screen, as shown below, where you can view differential source and frequency settings.



	Note: The use of OmniSTAR® differential requires purchase of a subscription from OmniSTAR. Settings related to using satellite differential correction vary based upon your geographic location. Setup details are explained below. More specific information can be obtained by contacting OmniSTAR.

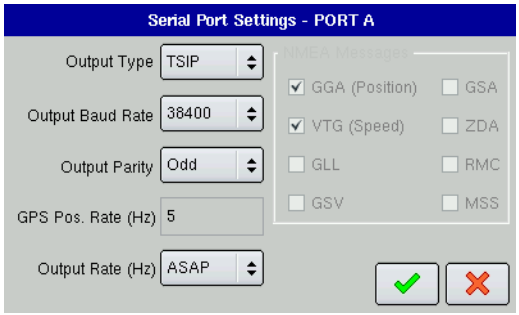
- **Serial Number/OmniSTAR User ID** - This box shows the serial number of your receiver. It may also display your OmniSTAR User ID.

	Note: You will need to know this number when contacting OmniSTAR in order to set up the receiver.

- **Differential Source** - The choices include VBS, HP/XP, and HP/XP with VBS backup.

Serial Port Settings

A Serial Port Settings screen, where you can adjust GPS output, is shown for both Port A and Port B. To go to this screen, first go to the Home screen, press the Wrench Button and go to the Setup Screen. Press the GPS button, and at the GPS General Tab appears, press the **Port Settings** button. The Serial Port Settings screen appears, as shown below. The appearance of this screen is the same for Port B.



- **Output Type** - Displays what type of protocol the receiver is using. (NMEA or TSIP).
- **Output Baud Rate** - Displays the speed at which the receiver communicates with the display. For optimal performance, the GPS baud rate should be set at 192000 or higher.

- **Output Parity** - Displays either **Odd** or **None**.
  - If using TSIP, this setting should be **Odd**.
  - If using NMEA, this setting should be **None**.

	Note: Parity refers to a technique for checking data integrity after transmission.

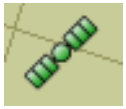
- **GPS Pos. Rate (Hz)** - Represents the cycles per second (shown in Hz) that the display receives position information from viewable satellites. (This is the same number as shown on GPS Rate (Hz) drop-down list menu located on the General Tab).

Serial Port Settings (continued)

- **Output Rate (Hz)** - Represents the cyclical rate (in Hz) at which the receiver sends information to the EDGE display. This field shows a value of either **1** or **ASAP**.
  - The default rate is **1 Hz**.
  - ASAP represents a Hz value of more than 1.

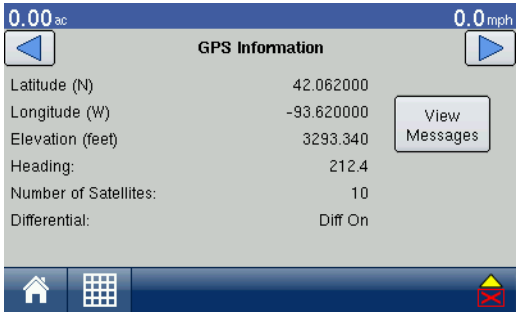
- **NMEA Messages** - These checkboxes represent various communication protocols or formats that have been set by the National Marine Electronics Association (NMEA), and used in information "strings" or sentences output by the GPS Receiver. At present, the EDGE display only uses two NMEA Message formats: **GGA** and **VTG**.
  - **GGA**: This NMEA message format is the data fix that establishes your position in longitude and latitude.
  - **VTG**: This NMEA message format stands for ground speed (velocity) in area over distance
  - **GLL**, **GSV**, **GSA**, **ZDA**, **RMC**, **MSS**: Leave these other NMEA message formats unchecked, unless you are connected to a third-party monitor and have been directed to do so.

GPS Diagnostics



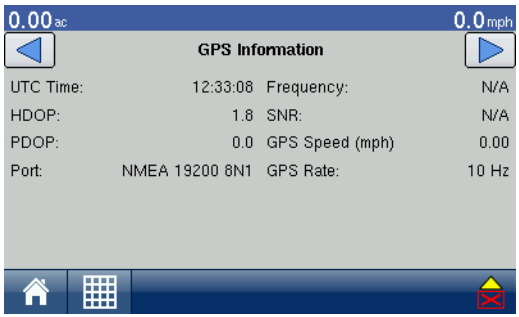
To access Diagnostic information about the GPS signal, press the Satellite icon that appears in the top-left corner of the Map Screen. GPS Information then appears on three different GPS Information screens. You can cycle through these screens by pressing the blue right-arrow button.

GPS Information - First Screen



- **Latitude, Longitude, Elevation** - Displays current position (in longitude and latitude) and elevation.
- **Heading** - Displays degree heading of travel.
- **Differential** - If a TSIP receiver is being used, the differential status will display the differential source,(i.e. WAAS, Beacon or OmniSTAR). This message field will display either Diff On or Diff Off.
  - **Diff On:** Indicates the receiver is receiving a differential GPS signal.
  - **Diff Off:** Indicates the receiver is not receiving a differential GPS signal.
- **View Messages** - To view the NMEA or TSIP messages coming from the receiver, press the View Messages button.

GPS Information - Second Screen



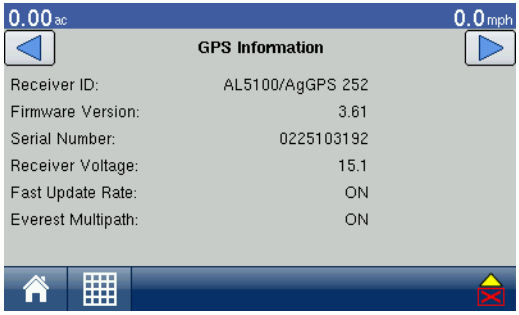
- **UTC Time** - UTC is an acronym for Coordinated Universal Time, a high-precision atomic time standard that defines local time throughout the world. Different versions of universal time use atomic clocks to correct for irregularities in the Earth's rotation and orbit. UTC is used in navigation, astronomy, aviation, Internet broadcasts, and amateur radio. If you are receiving information from the satellite, then the UTC Time should automatically update.
- **HDOP** - Horizontal Dilution of Precision (HDOP) indicates the quality of the horizontal GPS position. Lower HDOP numbers are optimal, higher numbers are undesirable.
- **PDOP** - Position Dilution of Precision (PDOP) is a unitless measure indicating when the satellite geometry can provide the most accurate results. When satellites are spread around the sky, the PDOP value is low and the computed position is more accurate. When satellites are grouped close together, the PDOP is high and the positions are less accurate. Lower PDOP numbers are optimal, higher numbers are undesirable.
- **Port** - The connection between the display and the GPS as established at a message format and baud rate.
- **Frequency** - The Correction Frequency indicates the GPS satellite frequency used by the receiver.

	Note: The Correction Frequency diagnostic does not show for WAAS connections.

GPS Information - Second Screen (continued)

- **SNR** - If your receiver is using Beacon differential corrections, the frequency and signal to noise ratio (SNR) will be displayed. Signal-to-Noise Ratio (SNR) indicates the strength of the differential correction signal in relation to the amount of background noise that can interfere with signal reception.
- **GPS Speed (mph)** - The speed of the vehicle.
- **GPS Rate** - The update rate from the GPS receiver, shown in Hz.

GPS Information - Third Screen

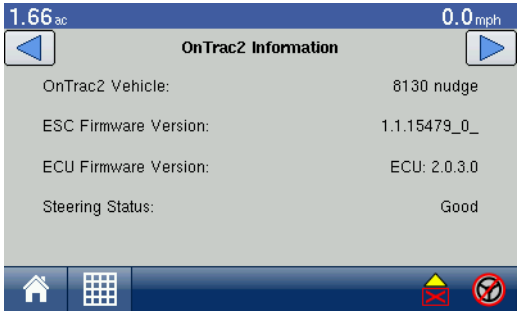


	Note: The settings shown on this GPS Information screen varies, depending upon your model of GPS receiver.

- **Receiver ID, Firmware Version, Serial Number**, **Receiver Voltage**.
- **Fast Update Rate** - The Fast Update Rate indicates whether your receiver is capable of outputting an update rate faster than 1 Hz per second.
  - If the Fast Update Rate is ON, then your receiver is capable of outputting an update rate faster than 1 Hz per second.
  - If the Fast Update Rate is OFF, then currently your receiver is only capable of an update rate of 1 Hz per second. Contact Ag Leader Technical Support to see if your receiver can be upgraded to a faster update rate.

OnTrac2 Information

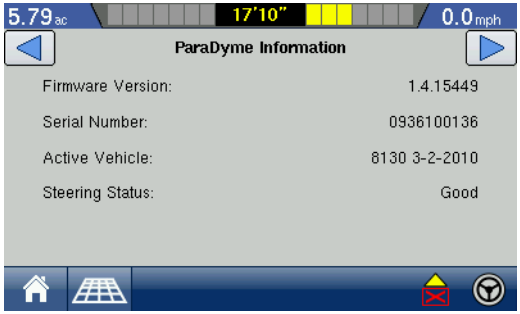
Users of the OnTrac2 guidance system can also view the OnTrac2 Information screen below, in addition to the GPS Information screens discussed previously.



- **OnTrac2 Vehicle** - Displays active vehicle profile.
- **ESC Firmware Version** and **ECU Firmware Version** - Displays current firmware versions for OnTrac2.
- **Steering Status** - Displays either **Good** or **Bad**. If the MDU does not have power, it will display a message stating **MDU Power Error**.

ParaDyme Information

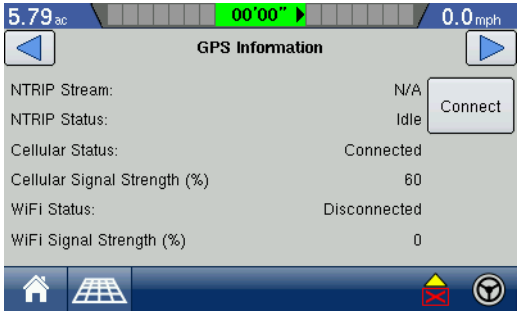
Users of the ParaDyme guidance system can also view the ParaDyme Information screen below, in addition to the GPS Information screens discussed previously.



- **Firmware Version** - Displays ParaDyme firmware version.
- **Serial Number** - Displays ParaDyme serial number.
- **Active Vehicle** - Displays current steering profile.
- **Steering Status** - Displays either **Good** or lists system errors.

NTRIP Information

Users of the NTRIP guidance system can also view the NTRIP Information screen below, in addition to the GPS Information screens discussed previously.



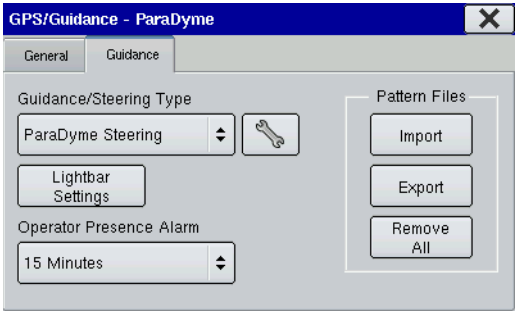
- **Connect** - Connects the display to the NTRIP correction source.
- **NTRIP Stream** - Network mount point.
- **NTRIP Status** - Displays NTRIP connection; either **Connected** or **Disconnected**.
- **Cellular Status** - Displays status of ParaDyme cellular modem; either **Connected** or **Disconnected**.
- **Cellular Signal Strength (%)** - Displays a number between 0 and 100%.
- **WiFi Status** - Displays status of WiFi router; either **Connected** or **Disconnected**.
- **WiFi Signal Strength** - Displays a number between 0 and 100%.

Guidance

The Guidance Tab, located on the GPS screen, includes some general settings for the on-screen lightbar and L160 External Lightbar features.

	Note: In order to use guidance with the EDGE display, you must have a GPS receiver capable of a GPS output rate of 5 Hz or more.

GPS Guidance Tab



Guidance Control

The Guidance Controls area of the Guidance Tab includes information specific to lightbar and guidance features.

- **Manual Guidance** - Select this to adjust lightbar settings. For more information, see *"Lightbar Settings" on page 61*
- **OnTrac2 Steering** - Select this for the OnTrac2 feature. For more information, *See "OnTrac2" on page 89.*

Guidance Control (continued)

- **ParaDyme Steering** - Select this for the ParaDyme feature. For more information, consult the ParaDyme Insert, PN 4002139 Rev. C.
- **Lightbar Settings** - Opens the Lightbar Settings screen. For more information, see *"Lightbar Settings" on page 61*.
- **Operator Presence Alarm** - Available for OnTrac2 and ParaDyme users. The Operator Presence Alarm disengages guidance control if the operator does not have any interaction with the EDGE display for a specified period of time. Use the drop-down menu to specify the period of time before guidance is automatically disengaged.

- Pressing the Wrench Button on the Guidance Tab opens the guidance system settings for the selected guidance system.

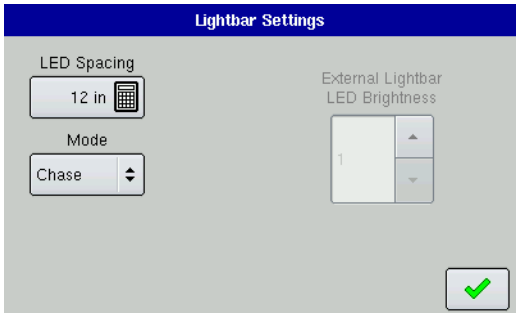
Pattern Files

The Pattern Files area of the Guidance Tab Imports guidance pattern files from the compact flash card. For more information, see the section beginning at *"Guidance Screen" on page 64*.

- **Import** - Imports guidance pattern files from the compact flash card.
- **Export** - Exports guidance pattern files from the EDGE display to the compact flash card.
- **Remove All** - This will remove all guidance pattern files from the EDGE display's internal memory.

Lightbar Settings

To adjust lightbar settings, press the Lightbar Settings button on the Manual Guidance screen. The **Lightbar Settings** screen appears, as shown below.



- **LED Spacing** - Enter in an amount specifying the distance represented by each square of the lightbar. You can enter in a number ranging between 6 and 72 inches.

- **Mode** - This determines which method to use the GPS information provided on the EDGE display's Map screen to center the vehicle on the AB Line. Select either **Chase** or **Pull**.
  - If you select **Chase**, then in order to center the vehicle on the AB Line, you must follow the indicator lights on the lightbar.
  - If you select **Pull**, then in order to center the vehicle on the AB Line, you must turn the vehicle in the opposite direction of the indicator lights on the lightbar.

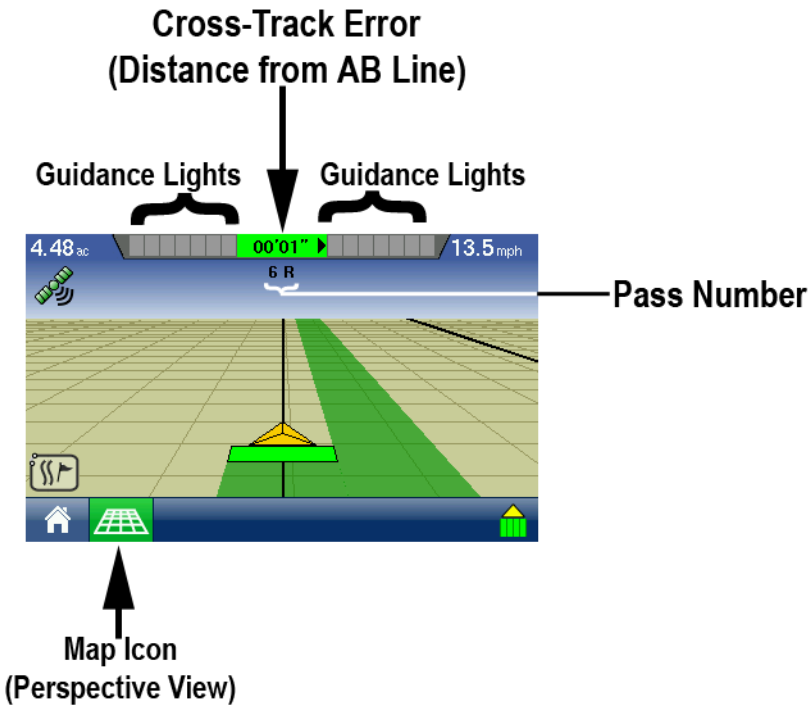
- **External Lightbar LED Brightness** - If applicable, use the up and down arrows to enter in a number specifying the brightness of the LED lights on the L160 lightbar. The number **1** is the dimmest setting and **10** is the brightest; the default setting is **5**.

Guidance Functions

EDGE users can use either Manual Guidance, OnTrac2, or ParaDyme for guidance operations. The setup procedures and use are explained below. Lightbar operation and pattern information applies to users of the Manual Guidance, OnTrac2 and ParaDyme features.

On-Screen Lightbar

The on-screen lightbar is an option for users who have not purchased an external lightbar. This on-screen lightbar will not appear if you are using an external lightbar.



- **Cross-Track Error** - The Cross-Track Error indicates your vehicle's distance from the AB Line. This distance from AB Line number shows the length between the location of your vehicle's GPS antenna and the nearest point on the closest pass.

On-Screen Lightbar (continued)

- **Guidance Lights** - The guidance lights indicate directional changes as you steer the vehicle right or left. You can specify the distance each guidance light indicates (for example, 6 inches or 1 foot)
- **Pass Number** - The number of passes (either right or left) from the AB Line.
- **AB Line** - The AB Line is a line that runs between Point A and Point B.In most cases, the AB Line is the reference line for subsequent swaths. When you press the Set A button on your EDGE display, the "A" point will appear on your display's screen. When you press the Set B button, the "B" point will also appear on the screen, and the line between the two points serves as your AB Line.

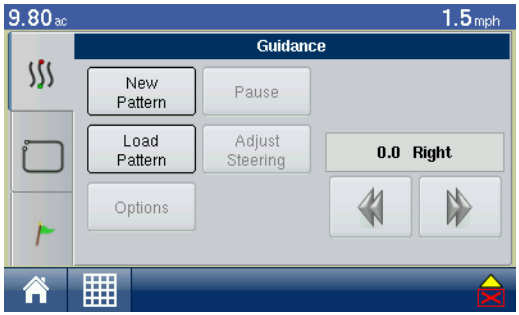
	Note: You do not have to set a B point for an A+ Pattern.

	In order for the lightbar to appear, you must first create a new pattern. *For more information, See "New AB Pattern" on page 65.*

Guidance Screen

The Guidance Screen is where you can create a new pattern, load an existing pattern, or adjust Guidance Options and Guidance Settings. At the Map Screen, press the Map Options button.

If the Guidance Screen does not automatically appear, press the Guidance button and go to the Guidance Screen. The Guidance Screen appears, as shown below. After you have created an AB line, the appearance of the Guidance Screen changes and different options are available.



The Guidance Screen includes the following

- **New Pattern**. For more information, *See "New AB Pattern" on page 65.* Also, *See "About Guidance Patterns" on page 80.*
- **Load Pattern**. For more information, *See "Load Pattern" on page 78.*
- **Reset.** For more information, *See "Reset Pattern" on page 77.*
- **Save Pattern.** For more information, *See "Save Pattern" on page 76.*
- **Options**. For more information, *See "Guidance Options" on page 86.*
- **Adjust Steering**. For more information, *See "Steering Adjustment" on page 104.*
- **A-B**. For more information, *See "Create an AB Line Within a SmartPath Pass" on page 73.* and also *"Choose Existing Lines Within SmartPath" on page 74*
- **Nudge settings**. For more information, *See "Nudge" on page 88.*

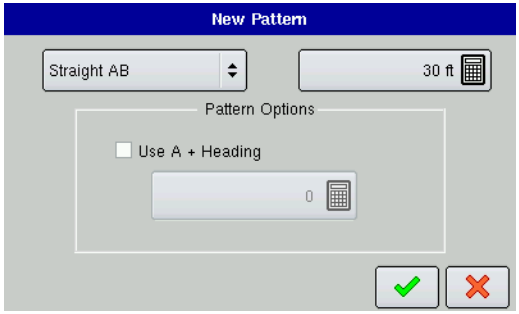
New AB Pattern

Use the following procedure to create a new pattern. The following example explains how to create an AB line.

	Note: Pattern options other than SmartPath and Straight AB are explained in full detail on "About Guidance Patterns" on page 80.

1 **Press New Pattern.** At the Guidance Screen, press the **New Pattern** button.

2 **Select Pattern** The New Pattern Screen appears, as shown below.



Select from the following available guidance patterns:

- **SmartPath** (for more information, *See "SmartPath" on page 69.*)
- **Straight AB**
- **Pivot** (for more information, *See "Pivot" on page 81.*)
- **Adaptive Curve** (for more information,*See "Adaptive Curve" on page 84.* and also *"Adaptive Curve" on page 87*)
- **Identical Curve** (for more information, *See "Identical Curve" on page 85.*)

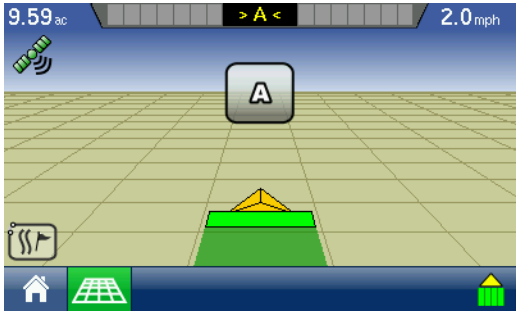
	Note: If you would like to use an A+ Heading pattern option, check the Use A+ Heading check box and use the number pad to enter in the heading (in degrees). For more information, See "A+ Pattern" on page 80.

New AB Pattern (continued)

3 **Change Guidance Width** (optional). In addition to these Guidance Options, a default Guidance Width is shown, based on the Implement Width that you specified in Implement Configuration. If you wish to change this Guidance Width, enter the new number using the numeric keypad. Press the green check mark box when finished.

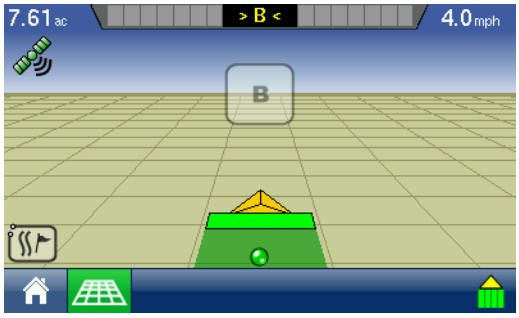
	Note: Guidance Width allows you to use guidance lines independent of implement width.

4 **Mark the A Point**. The Map Screen appears, with a point marker box in the center marked A, as shown below. Press the Set A button when you wish to mark your A point.



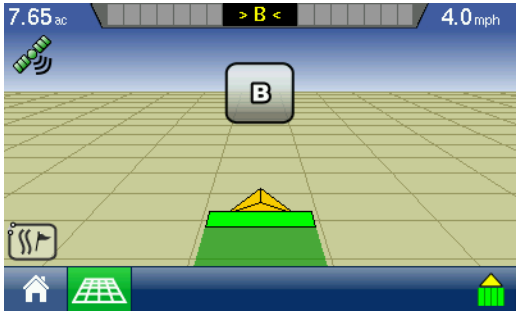
New AB Pattern (continued)

5 **Drive distance of AB Line.** The place where you marked your A point now appears with a green ball, as shown below. Additionally, the point marker box changes its appearance, so that the letter changes from Set A to Set B, however the Set B button appears as greyed out. You must drive a minimum of 100 feet (30 meters) before marking the B point.



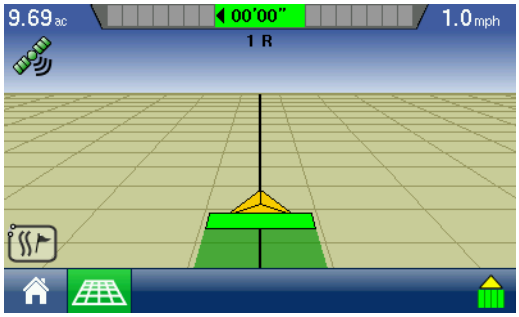
	Note: If you are creating a Pivot pattern, you must drive a minimum of 160 yards (49 meters) before marking the B point.

6 **Mark B Point**. After you have driven the appropriate distance, the Set B button appears as a solid text, after which time you can mark a B point.



New AB Pattern (continued)

7 **AB Line appears**. When you have marked the B point, the AB line appears on the Map screen as shown below. The end of the AB line is marked with a red point.

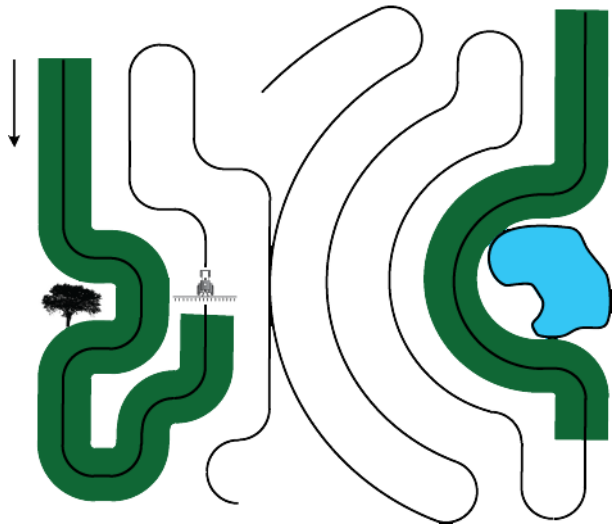


8 **Create next pass**. Turn left or right for the next swath. The next pass is automatically generated. Steer the vehicle so that you center the green lights on the lightbar as you drive forward along the swath.

	Note: On straight AB lines, if you complete a swath that is longer than the previous one, the EDGE display automatically extends the guidance path for the following swaths.

SmartPath

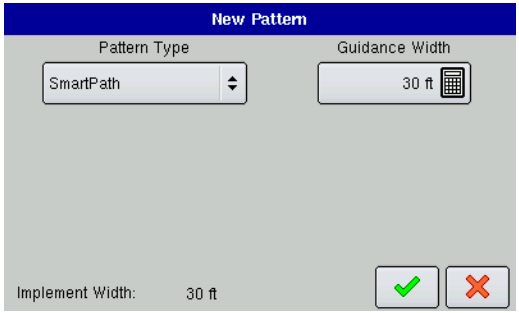
The SmartPath pattern is designed to give guidance from any previously-driven pass. This is used in irregular-shaped and terraced fields where you cannot run all passes parallel to the previous pass. Instead, the SmartPath guidance allows you to move to a different area of the field, and then resume a previous guidance pattern later. Moreover, you can use SmartPath to create straight AB patterns within the SmartPath pattern and cycle between any available pattern within SmartPath to choose the appropriate one.



EXAMPLE OF A SMARTPATH PATTERN

Creating a SmartPath Pattern

1. **Press New Pattern.** At the Guidance Screen, press the **New Pattern** button.
2. **Select Pattern**. The New Pattern Screen appears, as shown below.



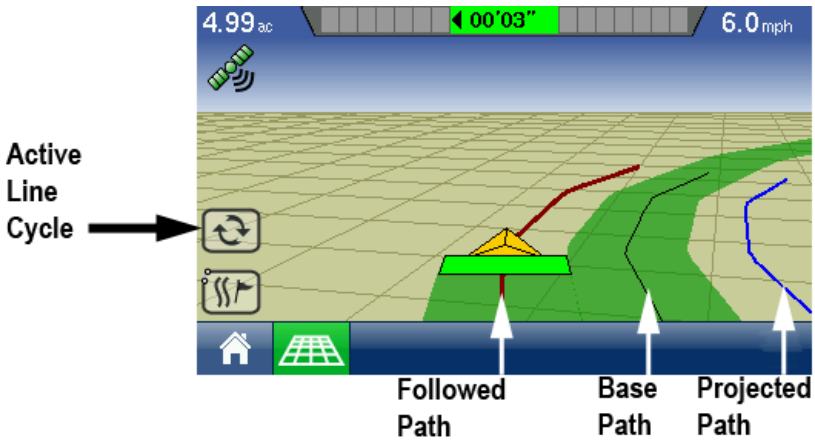
3. **Select SmartPath**. Select SmartPath from the drop-down list of available guidance patterns.
4. **Change Guidance Width** (optional). In addition to these Guidance Options, a default Guidance Width is shown, based on the Implement Width that you specified in Implement Configuration. If you wish to change this Guidance Width, enter the new number using the numeric keypad. Press the green check mark box when finished.

	Note: Guidance Width allows you to use guidance lines independent of implement width.

Creating a SmartPath Pattern (continued)

5 **Drive the SmartPath**. The Map Screen changes its appearance to Perspective View, and the Active Line Cycle button appears on the Map Screen.

6 **Turn Around**. After you turn around on your first pass, the system guidance will follow a maroon-colored line parallel to your previously-driven pass. An example is shown in the picture below.



As you continue using the SmartPath, the map screen will display three lines:

- The **Base Path**, which appears as a black line, is the initial SmartPath that you created on the first pass.
- The **Followed Path**, which appears as a maroon-colored line, is the path that your vehicle is currently using.
- The **Projected Path**, which appears as a blue-colored line on the opposite side of the Base Path, is an alternate path parallel to the Base Path. The system guidance created this path when you created the Base Path. This is the path that your vehicle would have taken if you had turned it in the opposite direction.

Creating a SmartPath Pattern (continued)

SmartPathNotes:

- The Projected Path and Base Path both remain in display memory, unless you press the **Reset All** button without saving the SmartPath pattern.
- Pressing the **Save Pattern** button saves all the SmartPath passes within the display's memory for future use.
- If you drive your vehicle onto the Projected Path, the system guidance uses this as the Followed Path.

Select a Previous SmartPath Pass

If you have specified SmartPath as your desired pattern, but you are not following an active guidance pattern, the Guidance System automatically begins searching for SmartPath patterns for your use.

If you wish to use a previously-created SmartPath pattern, you can do so by pressing on the Active Line Cycle button. This button allows you to cycle between available SmartPath patterns.

Notes:

- When the guidance system looks for other available SmartPath patterns, it first displays the nearest-available pass.
- You can adjust the avilable area in which the Guidance System searches for previously-created SmartPath passes. To do this, adjust the Heading Threshold settings on the Smart Tab of the Guidance Options screen. For more information, *See "SmartPath Guidance Options" on page 75.*

Create an AB Line Within a SmartPath Pass

In addition to creating irregular curved passes within SmartPath, you can also create straight AB lines to be used in conjunction with the curved passes. By doing this, you can switch back and forth between a SmartPath and a Straight AB pattern.

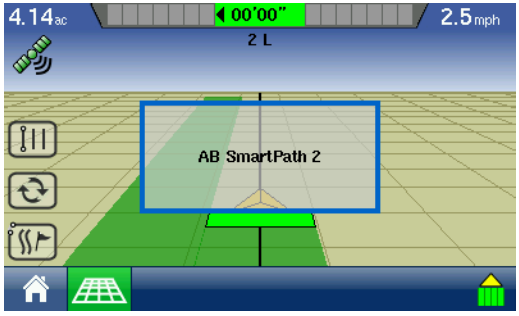
As you are using a SmartPath pattern, go to the Guidance Screen and press the **A-B** button. Follow the instructions on creating an AB line as explained in *"New AB Pattern" on page 65*.

Once the AB line is created you can switch between the AB line and SmartPath patterns by pressing the AB/SmartPath toggle.

A-B/SmartPath Toggle

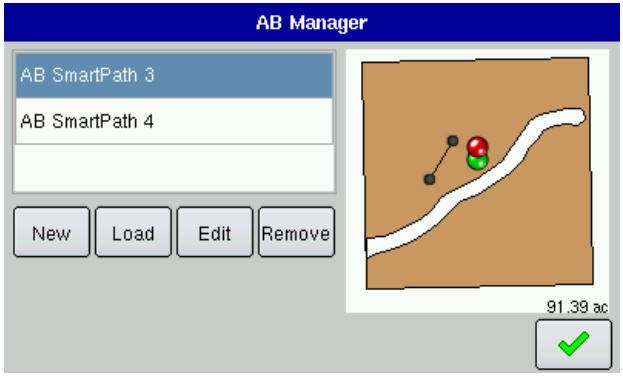
Curved Lines	Straight AB Line

After the Guidance System has switched over to a different path, the name of the currently-followed pattern is shown within a black box on the Map Screen, as shown below.



Choose Existing Lines Within SmartPath

You can create up to three different AB lines within SmartPath. select the desired AB line by pressing the **A-B** button on the Guidance Screen. The AB Manager Screen appears, which shows all AB lines created within a particular field. An example is shown below.

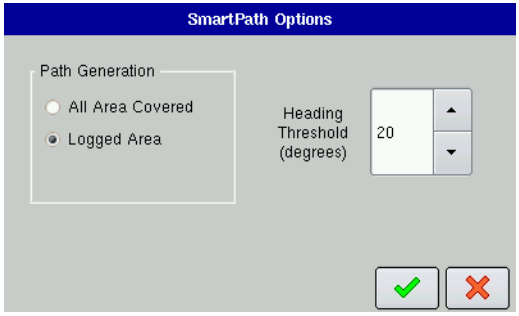


- Highlight the desired AB line, then press the green check mark button to close the screen.
- Press the **New** button to add an AB line.
- Press the **Load** button to load an AB line.
- Press the **Edit** button to edit the name of an AB line.
- Press the **Remove** button to remove an AB line.

SmartPath Guidance Options

SmartPath only creates a SmartPath pass when you are logging data in the field. However, you have the option of using it to create SmartPath passes continually during all field operations.

To adjust this setting, press the Options button on the Guidance screen. At the Guidance Options screen, press the **Smart** button. The SmartPath Options screen appears, as shown below.



Notes:

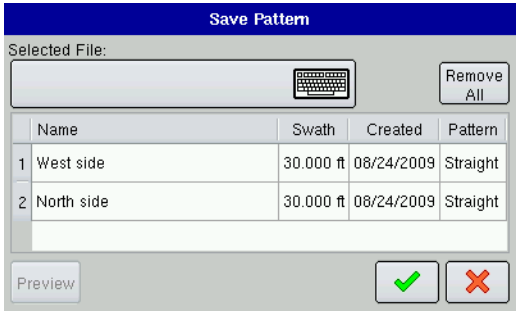
- The default setting is **Logged Area**. This setting only creates passes when you are logging field data.
- By selecting **All Area Covered**, you can create SmartPath passes even when not logging field data.
- The **Heading Threshold** setting is the available area that the Guidance System uses to search for previously-created SmartPath passes. The default setting is 20 degrees.

Save Pattern

You can save a pattern (.pat file) to the EDGE display's internal memory to the current field by using the following procedure.

1 Press **Save Pattern**. The Save Pattern screen appears, as shown below.

	Note: The Save Pattern button will appear when there is an active pattern.



2 **Name the pattern**. Press the keyboard button and enter a unique pattern name. When finished, press the green check mark box.

Notes:

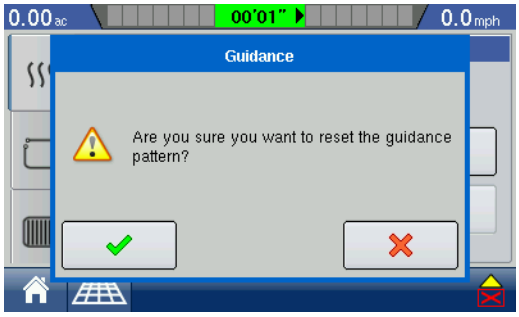
- To verify that the pattern is saved, you can open the Save Pattern screen again by pressing the **Save Pattern** button. Your newly-saved or named pattern should now appear in the Save Pattern screen.
- You may remove all of the patterns by pressing the **Remove All** button. A warning appears, stating "All guidance patterns will be permanently erased from memory." If you wish to do this, press the green check mark box to continue.

Reset Pattern

If you have been using an already-saved pattern, and wish to switch over to a different pattern in the same field, you can use the Reset Pattern feature by following the steps below.

1 **Press Reset**. Press the **Reset** button on the Guidance screen.

2 **Confirm Reset**. The Guidance screen appears, asking you to reset the current guidance pattern. Press the green check mark box to continue.



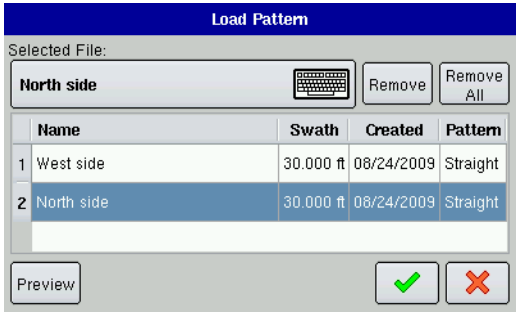
3 **Create new pattern** (optional). The pattern is now reset. You may now create a new pattern, if desired.

Load Pattern

You can load a pattern from the EDGE display's internal memory to the current field by using the following procedure.

1 **Press Load Pattern**. Press the **Load Pattern** button on the Guidance screen.

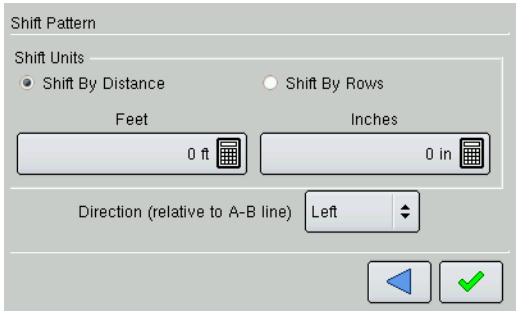
2 **Select a Pattern**. The Load Pattern screen appears, as shown below. Select and highlight the desired pattern. If the pattern you selected was an AB Line, that pattern now appears on the Map screen. Press the green check mark box to continue.



3 **(Optional) Enter Guidance Width.** The Shift Pattern screen appears. The default Guidance Width is shown, based on the Implement Width that you specified in Implement Configuration. If you wish to change this Guidance Width, enter the new number using the numeric keypad. Press the blue right-arrow button to continue.

Load Pattern (continued)

4 **Select Shift Pattern**. The Shift Pattern screen appears, as shown below.



- If you have chosen the **Shift by Distance** option, use the numeric keypads to select the distance, in feet and inches, that you wish to shift the pattern. Use the bottom drop-down menu to enter the direction, (either left or right), which you wish to shift the pattern relative to the AB Line. When finished, press the green check mark box.
- If you have chosen the **Shift by Rows** option, use the first numeric keypad to select the number of rows you wish to shift. Next, use the second numeric keypad to select the row spacing in inches that you wish to shift the pattern. Use the bottom drop-down menu to enter the direction, (either left or right), which you wish to shift the pattern relative to the AB Line. When finished, press the green check mark box

.

	Note: For an illustration of the Shift by Rows option, *See "Pivot (continued)" on page 82.*

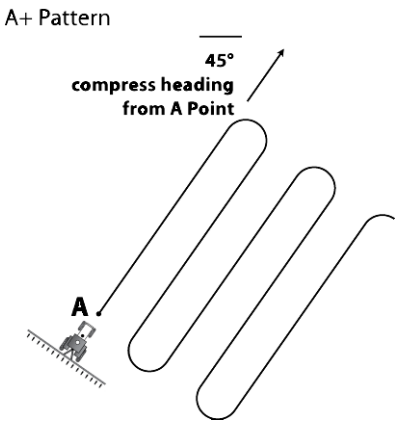
About Guidance Patterns

The following pages define available guidance pattern other than a SmartPath or Straight AB Line.

- For a description of a Straight AB line, *See "New AB Pattern" on page 65.*
- For a description of SmartPath, *See "SmartPath" on page 69.*

A+ Pattern

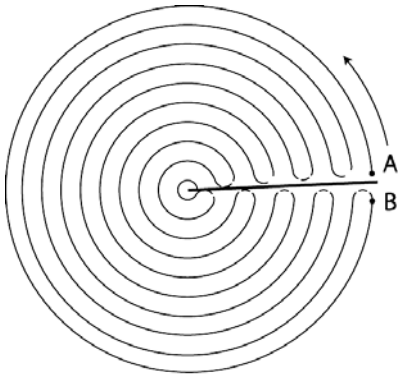
Similar to an AB line, an A+ line is also a straight line. It is defined by a single point on the line (the A point) and the heading of the line. Use this pattern when you wish to make a straight line based on a compass heading. The A+ line extends 1 mile (1.6 km) before and after the A point.



1. At the Guidance Screen, press the **New Pattern** button. Choose Straight AB, and enter a swath width. Press the **Use A+ Heading** check mark box and enter in a degree number. Press the green check mark box when finished. You will automatically return to the Map screen.
2. To map the start of the first swath, map Point A. The heading of the AB line equals either the previous AB heading of the manually-entered heading (if the current vehicle is within plus or minus 90 degrees of the AB heading). Otherwise, the A+ heading is in the opposite direction.
3. Follow the AB line for guidance down the first swath.
4. Turn left or right for the next swath. The next swath is automatically selected.
5. Steer the vehicle so that you center the green lights in the lightbar as you drive forward along the swath.

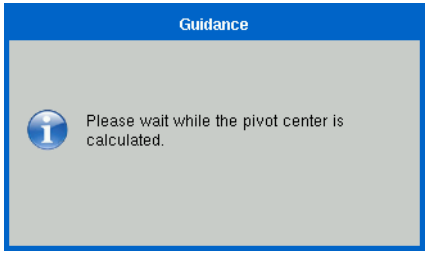
Pivot

Use the Pivot pattern for a field that is irrigated using a center-pivot. With this pattern, you can drive concentric circles around the center-pivot. The EDGE display will calculate the center point based on where you have driven. Otherwise, you can enter in the latitude and longitude of the center point, if known.



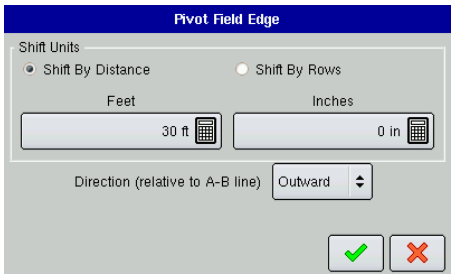
Pivot Pattern

Pivot AB Line



1. At the Guidance Screen, press the **New Pattern** button. Choose Pivot, and enter a swath width. Press the green check mark box when finished. You will automatically return to the Map screen.
2. Position one wheel of the vehicle in a pivot wheel rut, with the rear of the vehicle to the pivot arm.
3. To start the pivot, set Point A.
4. Drive around the field. Keep the vehicle wheel in the rut. The lightbar does not yet provide guidance.
5. When you are almost back to the pivot arm or the edge of the field, set Point B.
6. A screen appears, as shown below left. It states: “Please wait while the Pivot Center is calculated”.

Pivot (continued)



Pivot Field Edge screen (shown for Shift by Rows)

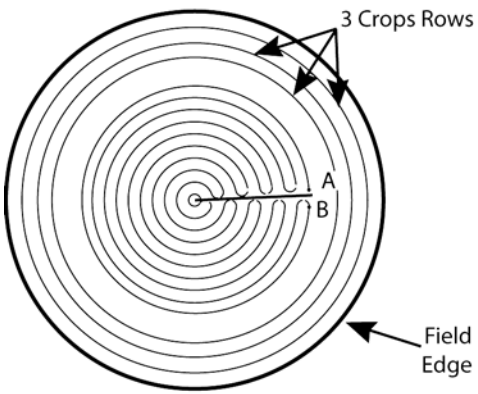
Next, you must set the Field Edge. You may do this when the Pivot Field Edge screen appears on your EDGE display, as shown below left. From here, you may choose one of three options:

- **Shift By Distance** - This sets the field edge as the distance and direction in relation to the AB Line created. In the Pivot Field Edge Distance portion of the screen, enter the distance in feet and inches.
- **Shift By Rows** - This sets the field edge as the number of crop rows multiplied by the number of spacing. In the Pivot Field Edge Distance portion of the screen, enter the Number of Rows and Row Spacing. In the example shown at bottom left, if you entered 3 rows and 30 inch-spacing, the field edge would equal 90 inches.
- **Close** (red X)- The vehicle uses the driven pass as the AB Line.

Use the numeric keypads to enter the Number of Rows and Row Spacing. Choose the direction relative to the AB Line (either Outward or Inward), and press the green check mark box.

7 Turn left or right for the next swath. The next swath is automatically selected.

8 Steer the vehicle so that you center the green lights in the lightbar as you drive forward along the path.

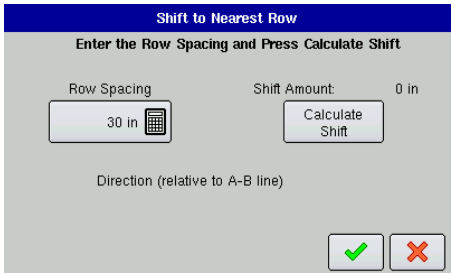


Shift By Rows example

Note: To work from the center of the field outwards, the initial pivot must have:

- A radius of at least two swath widths.
- An arc length of at least two swath widths.

Pivot (continued)

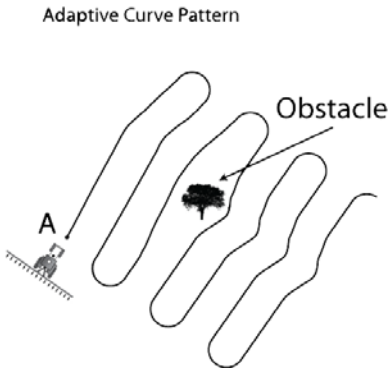


Notes:

• You can shift to the nearest row by going to the Guidance Screen and pressing Options. At the Guidance Options screen, press the **Nearest Row** button. The Shift to Nearest Row screen appears, as shown at left. Use the numeric keypad to enter in Row Spacing, and then press the Calculate Shift button in order to enter in the amount of distance to shift. Press the green check mark box when finished.

Adaptive Curve

Use the Adaptive Curve pattern to follow gentle contours in the field, or when you need to avoid obstacles. This pattern provides guidance based on the last curve driven.



1. At the Guidance Screen, press the **New Pattern** button. Choose Adaptive Curve, and enter a swath width. Press the green check mark box when finished. You will automatically return to the Map screen.
2. At the start of the first swath, map Point A.
3. Drive the initial curve. At the other end of the first swath, map Point B.
4. Turn left or right for the next swath. The next swath is automatically selected.
5. Steer the vehicle so that you center the green lights in the lightbar as you drive forward along the swath.

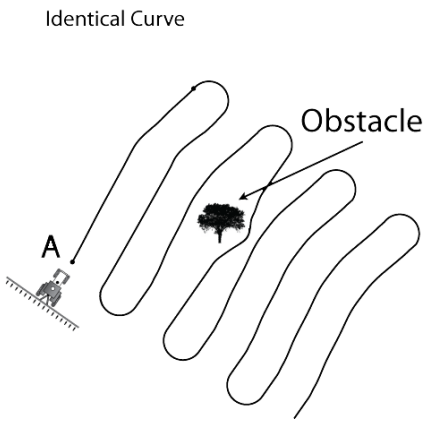
Notes:

• Guidance extends beyond the end of curved swaths. This makes it possible to get LED guidance back onto the swath if the vehicle drives past the end of a swath. The extended swath lines do not appear on screen.

• You can adjust the degree heading at which the system generates the next pass by doing the following: Go to the Guidance screen and press the Options button. The Guidance Options screen appears; press the **Adaptive Curve** button. At the New Pass drop-down menu, select Heading Change, then use the numeric keypad to enter in the degree number of your Heading Threshold.

Identical Curve

Use the Identical Curve pattern when you want to work the field with gentle curves. This pattern provides guidance based on the initial curve. It ignores any deviation around an obstacle



1. At the Guidance Screen, press the **New Pattern** button. Choose Identical Curve, and enter a swath width. Press the green check mark box when finished. You will automatically return to the Map screen.
2. At the start of the first swath, map Point A.
3. Drive the initial curve. At the other end of the first swath, map Point B.
4. Turn left or right for the next swath. The next swath is automatically selected.
5. Steer the vehicle so that you center the green lights in the lightbar as you drive forward along the swath.

Note: Guidance extends beyond the end of curved swaths. This makes it possible to get LED guidance back onto the swath if the vehicle drives past the end of a swath. The extended swath lines do not appear on screen.

Guidance Options

The **Options** button on the Guidance Screen becomes active after you have set an AB line. The **Options** button opens the Guidance Options screen. The appearance of the Guidance Options screen varies, depending upon the pattern type you have selected. Three Guidance Options features described here and on the following page include **Pause**, **Remark A** and **Shift**.

Pause

The **Pause** button allows your EDGE display to stop logging points along an AB Line. Once this button is pressed, a **Resume** button will take its place until you press this button and **Pause** reappears.

	Note: If you are using the EDGE display to follow a set AB Line and wish to temporarily deviate from this line, you can use the Pause button to pause the EDGE display's logging activity. This feature could be used, for example, by a vehicle operator who must refill a sprayer. When paused, the EDGE display will continue to give the distance back to the original pause point position.

1 **Press Pause button.** Press the **Pause** button on the Guidance screen. When you do so, the place where you paused appears on the Map screen as a yellow ball.

	Note: You can pause a pattern even if you have not set the "B" point yet. If you do so, the message in the lightbar will read "Need B." If you pause the pattern after you have set your AB Line, then the lightbar will indicate the distance your vehicle must travel to return to the pause point.

2 **Press Resume button.** To resume your pattern, press the **Resume** button to resume logging on your AB Line.

	Note: If you press the Resume button before you have returned to the original AB Line, your EDGE display will select the closest AB Line to your vehicle.

Remark A

If you chose **Straight AB** or **A+ Heading** as your pattern option at the New Pattern screen, the **Remark A** button appears on the Guidance Options screen. The **Remark A** button "re-marks" the A point by moving it to the current position while maintaining the same heading. A brief message appears in the on-screen lightbar, stating "**Point A Remarked**."

Shift

For an explanation of the Shift Pattern feature, see *"Load Pattern (continued)" on page 79*.

Adaptive Curve

If you chose **Adaptive Curve** as your pattern option at the New Pattern screen (*See "New AB Pattern" on page 65.* and also *"Adaptive Curve" on page 84*) then the **Adaptive Curve** button appears on the Guidance Options screen. This button opens the Adaptive Pattern Options screen. At this screen, you can choose pattern options that tell the system where to log a new pass. These options include:

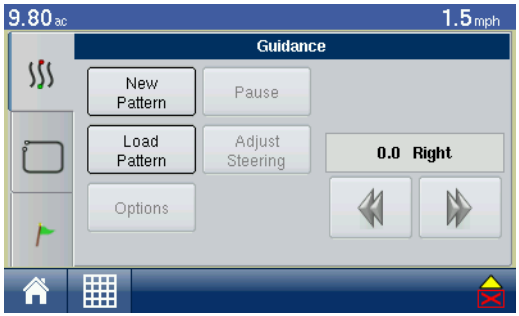
- **New Pass**. This sets the conditions for the EDGE display to log a new pass. Select either **Area Count** or **Heading Change**.
  - **Area Count** generates the next pass, based on coverage area of the previous pass. The EDGE display must be logging coverage data in order to generate the next pass.
  - **Heading Change** logs the next pass when the vehicle turns past the heading threshold.

- **Heading Threshold**. Enter in the degree of turning angle that your vehicle will need to make before creating another pass.

	Note: You should always set the Heading Threshold number past 90 degrees. The default number is 110 degrees.

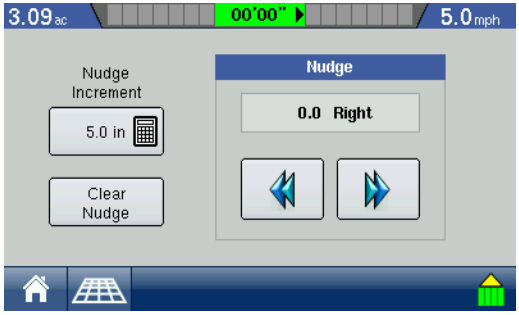
Nudge

You can adjust Nudge settings at the Guidance Screen, shown below. The blue double arrows allow you to adjust the AB Line by the specified distance left or right.



	Note: The Nudge setting is only available with SmartPath, AB, A+ and Pivot patterns.

Pressing the **Options** button opens the Guidance Options screen, which is discussed at *"Guidance Options" on page 86*. Pressing the **Nudge** button on the Guidance Options screen opens the Nudge screen, as shown below.



- Use the numeric keypad to enter a distance to move the swaths.
- To clear out the adjustment and go to the original position, press **Clear Nudge**.

OnTrac2

You can access the OnTrac2 guidance feature by pressing the GPS button and going to the GPS Guidance Tab. Under the Guidance Control drop-down menu, select **OnTrac2 Steering**. Acknowledge the Automatic Steering Liability Notice by pressing **Accept**, and wait for the steering software to initialize.

OnTrac2 Setup Tasks

Upon installation of the OnTrac2 hardware, you must set up a new configuration using the OnTrac2 guidance feature, by performing the following tasks:

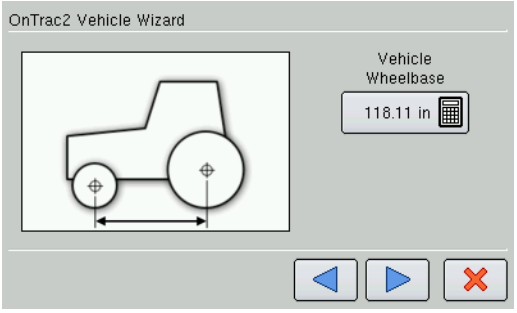
- **Configure a vehicle** on the OnTrac2 Configuration Tab. For more information, *See "Vehicle Configuration" on page 90.*
- **Calibrate OnTrac2**. For more information, *See "Calibrating OnTrac2" on page 95.*(Adjusting the Disengage Sensitivity should be included with this calibration procedure).
- **Perform a Steering Diagnostics Check**. For more information, *See "OnTrac2 Steering Diagnostics" on page 99.*
- **Adjust the tuning parameters.** For more information, *See "Tuning" on page 106.*
- **Adjust the Response Rate and Line Acquisition Rate settings as necessary.** These improve how the vehicle acquires and holds the AB line. For more information, *See "Steering Adjustment" on page 104.*

Vehicle Configuration

Press the Setup (wrench) tool and go to the OnTrac2 Vehicle Configuration Tab. Create an OnTrac2 vehicle configuration.

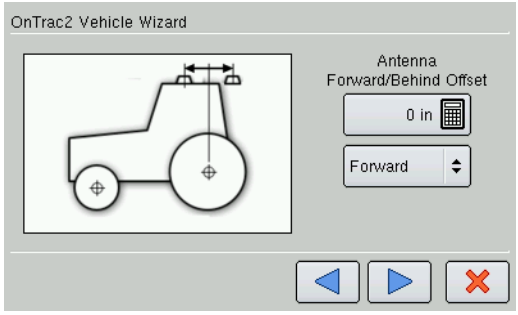
	Note: Even if you already performed a vehicle configuration in Setup, you must still perform a vehicle configuration at the OnTrac2 Tab. The two vehicle configurations - in Setup and OnTrac2 - are independent of each other.

1. **Press the Add button**.
2. **Choose Vehicle Style**. Enter the type of your vehicle. Press the blue right-arrow button to continue.
3. **Enter the Wheel Base**. Use the numeric keypad to enter the vehicle wheel base. Press the blue right-arrow button to continue.



Vehicle Configuration (continued)

4 **Enter Antenna Forward/Behind Offset.** Use the numeric keypad to enter the antenna Forward/Behind position. Press the blue right-arrow button to continue.

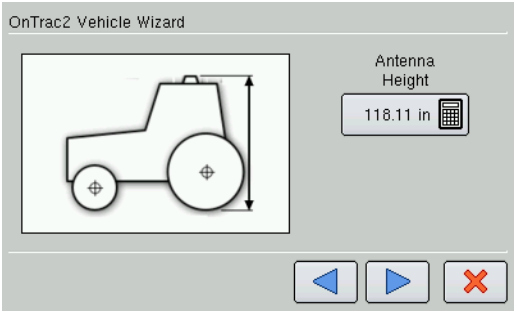


	Note: Forward indicates the antenna is located in front of the vehicle's control point. Behind indicates the antenna is located behind the vehicle's control point. Be sure to select the appropriate offset for your configuration.

	Note: The Control Point of a vehicle varies, depending upon the type of vehicle. These variations are as follows: • Standard Wheeled Vehicle, Sprayer, and Floater - Rear Axle • Track Vehicle - Center of tracks • Articulated Tractor - Pivot point of vehicle • Combine/Swather - Front Axle

Vehicle Configuration (continued)

5 **Enter Antenna Height.** Use the numeric keypad to enter the Antenna Height position. Press the blue right-arrow button to continue.



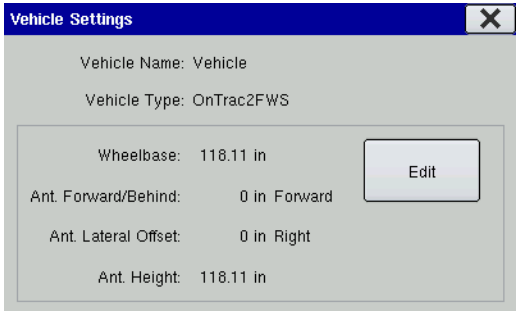
	Note: Antenna height is measured from the base of the antenna to the ground.

6 **Enter Vehicle Name.** Use the on-screen keyboard to enter in a vehicle name. Press the blue right-arrow button to continue.

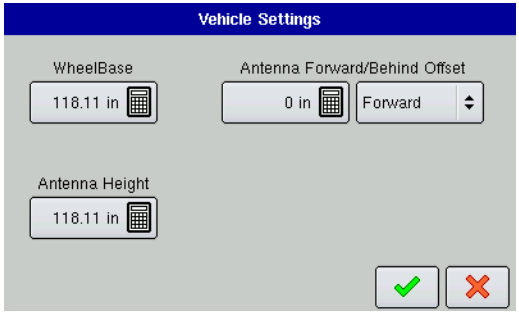
7 **Acknowledge the Confirmation**. The Confirmation screen shows your vehicle name and settings. Press the green check mark box to finish the configuration. The newly-configured vehicle will now appear in the list underneath the Vehicle Tab.

Edit Vehicle Settings

1 **Open Vehicle Settings Screen**. At the OnTrac2 Vehicle Tab, press the Setup (wrench) tool. At the Vehicle Tab, highlight the vehicle and press the Setup (wrench) tool at this screen. The Vehicle Settings screen appears, as shown below.



2 **Press Edit.** Press the **Edit** button, and a second Vehicle Settings screen appears, as shown below.



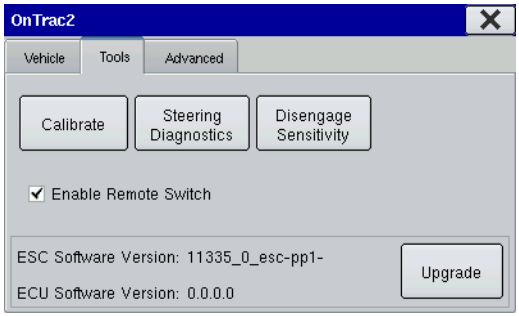
3 **Adjust Settings, if necessary**. At the Vehicle Settings screen, you can adjust the following settings:

- **Wheel Base**
- **Antenna Forward/Behind Offset**
- **Antenna Height**

Press the green check mark box when finished.

OnTrac2 Tools Tab

The OnTrac2 Tools Tab is where you can calibrate OnTrac2, perform a Vehicle Steering Diagnostics check, perform a Steering Tuning Adjustment, enable a Remote Engage Switch, and upgrade ESC firmware.



- **Calibrate** - Starts the procedure to calibrate OnTrac2. For more information, *See "Calibrating OnTrac2" on page 95.*
- **Steering Diagnostics** - Performs a Vehicle Steering Diagnostics check. For more information, *See "OnTrac2 Steering Diagnostics" on page 99.*
- **Disengage Sensitivity** - The Disengage Sensitivity adjusts how hard you have to turn the wheel to get the OnTrac2 guidance to disengage and return to manual steering. For more information, *See "Adjust Disengage Sensitivity" on page 101.*
- **Enable Remote Switch** check box - Enables the OnTrac2 operation to use a Remote Engage Switch.

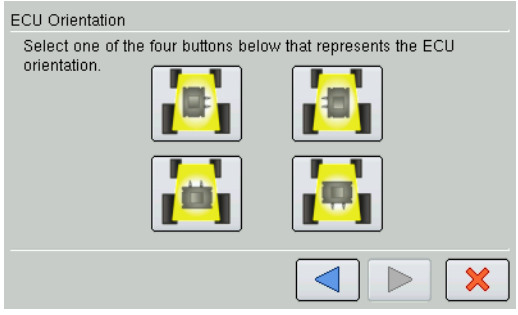
	Note: The Remote Engage Switch is an optional feature. Contact an Ag Leader sales representative for details.

- **Upgrade** - Upgrades the ECU firmware.

Calibrating OnTrac2

Calibration of the OnTrac2 should be performed after you install it on your vehicle. This calibration procedure consists of four main tasks: Selecting the Electronic Control Unit (ECU) orientation, Calibrating the Tilt Sensor, Adjusting the minimum output for the Motor Drive Unit, and Adjusting the Disengage Sensitivity.

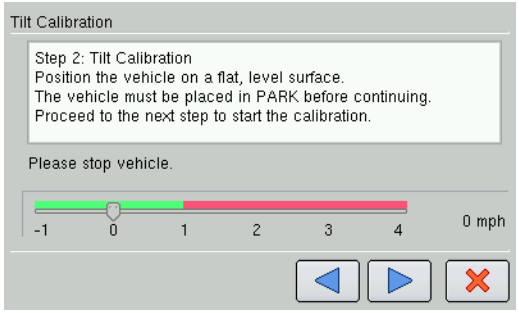
1. **Open Calibration Screen**. At the GPS Guidance Tab, press the Setup (wrench) tool. Go to the OnTrac2 Tools Tab. Press the **Calibrate** button, and the Calibration screen opens.
2. **Read Calibration Instructions**. Read the calibration instructions and press the blue right-arrow button to continue.
3. **Select ECU Orientation**. Select one of the four buttons (pictures) that accurately represents the direction that the cable connectors on the ECU are facing. Press the blue right-arrow button to continue.



	Note: Mount the ECU so that is lies flat. Do not install it on its side or at an angle that is diagonal to the vehicle direction.

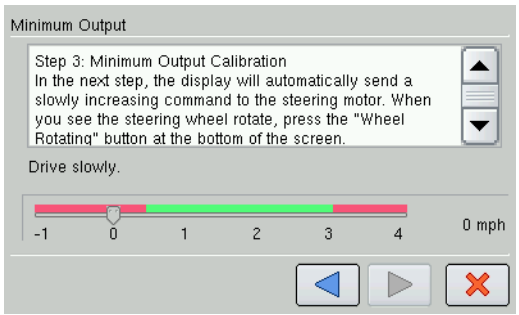
Calibrating OnTrac2 (continued)

4 **Calibrate Tilt Sensor**. Place the vehicle in Park on a flat, level surface. Press the blue right-arrow button to continue. The **Calibration in Progress** messages display and a countdown simultaneously takes place.



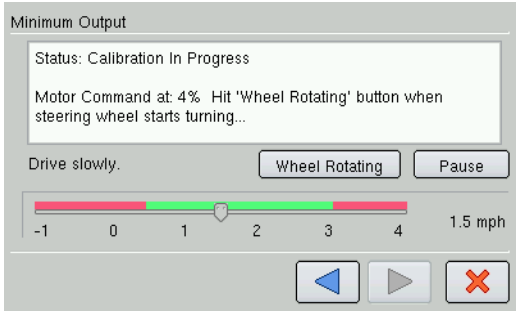
	Notes: The vehicle must be sitting on a flat, level location and must not move while the ECU Orientation takes place.

5 **Begin Minimum Output Calibration**. The Minimum Output Calibration screen appears. Calculating the minimum output tells the ECU how much electrical current is needed to make steering adjustments. Drive your vehicle forward in a straight line between .05 and 3.0 mph (.8 kph to 4.8 kph). The **Calibration in Progress** messages display


Minimum Output
Step 3: Minimum Output Calibration
In the next step, the display will automatically send a slowly increasing command to the steering motor. When you see the steering wheel rotate, press the "Wheel Rotating" button at the bottom of the screen.
Drive slowly.
-1
0
1
2
3
4
0 mph

Calibrating OnTrac2 (continued)

6 **Wheel Rotating.** As you drive forward, your wheel will begin to rotate. Press the **Wheel Rotating** button when this happens. The Disengage Test message then displays. Press the blue right-arrow button to continue.

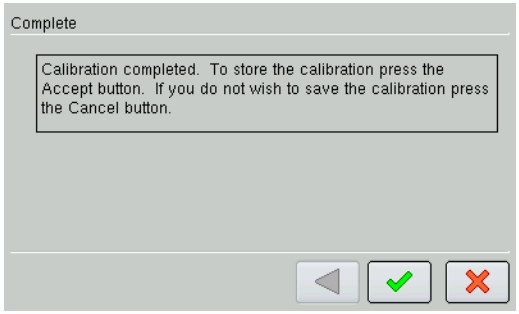


Notes:

- If you run out of space in the field at any time during the Calibration procedure, you can manually reposition the vehicle by pressing the **Pause** and **Resume** buttons.
- The default Disengage value should be adequate. However, if the system disengages too easily during normal field operations, *See "Adjust Disengage Sensitivity" on page 101.* to adjust the Disengage value to a setting that works.

Calibrating OnTrac2 (continued)

7 **Calibration Complete**. Press the green check mark box to accept the calibration.

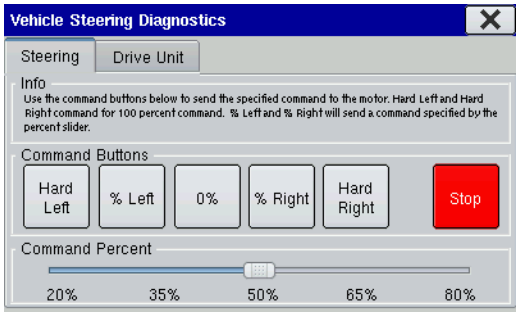

Complete
Calibration completed. To store the calibration press the Accept button. If you do not wish to save the calibration press the Cancel button.

OnTrac2 Steering Diagnostics

Perform a Vehicle Steering Diagnostics check after a new vehicle installation. This verifies that the MDU and the OnTrac2 System are operating correctly, adjusts the Disengage Sensitivity, and (for those who wish to use a Foot Pedal) enables Remote Engage/Disengage.

To begin the diagnostics check, go to the OnTrac2 Tools tab and press the **Steering Diagnostics** button. The Steering Tab displays, as shown below. Use the buttons to send the specified command to the motor. Observe that the wheel behaves according to the specified command.

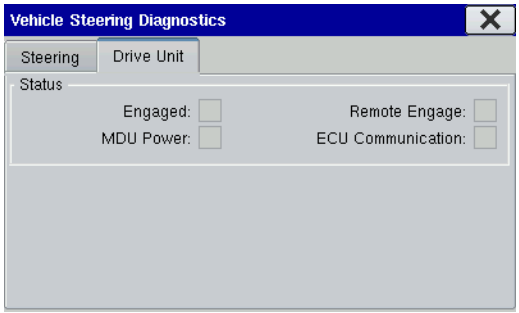
Steering



- **Hard Left**, **Hard Right** buttons - Turns the wheel left or right 100 percent.
- **% Left**, **% Right** buttons - Turns the wheels left or right in the percentage amount specified by the Command Percent slider bar at the bottom of the screen.
- **0%** button - The Zero Percent button stops the steering wheel's turning motion.
- **Stop** button - Ends the Vehicle Steering Diagnostics procedure.
- **Command Percent** slider - Controls the percentage of directional change on intermediate left and right turns.

Drive Unit

The Drive Unit Tab displays the following information:

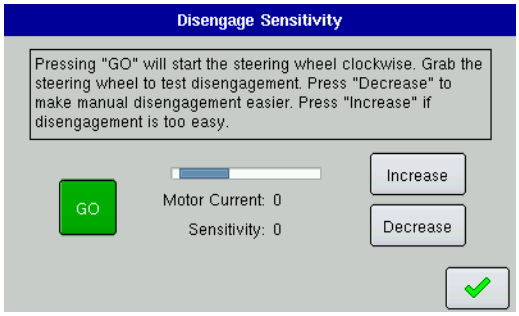


Status

- **Engaged** - Shows the OnTrac2 system is actively attempting to turn the steering wheel.
- **MDU Power** - Shows the MDU Power Switch is set to On.
- **Remote Engage** - Flashes green when the remote switch is pressed.
- **ECU Communication** - Fast blinking green indicates normal operation.

Adjust Disengage Sensitivity

The Disengage Sensitivity adjusts how hard you have to turn the wheel to get the OnTrac2 guidance to disengage and return to manual steering.


Disengage Sensitivity
Pressing "GO" will start the steering wheel clockwise. Grab the steering wheel to test disengagement. Press "Decrease" to make manual disengagement easier. Press "Increase" if disengagement is too easy.
GO
Motor Current: 0
Sensitivity: 0
Increase
Decrease

Press the **GO** button and the steering wheel will begin to move clockwise.

- If steering disengages too easily, press **Increase**.
- If steering does not disengage easily, press **Decrease**.

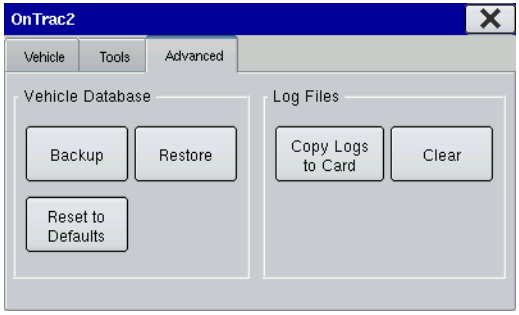
Other Notes:

- If the limit is set too low the system will disengage under normal conditions.
- On some vehicles, disengaging steering is easier through the use of the Remote Engage Switch instead of grabbing the steering wheel.
- The Remote Engage Switch is optional. Contact an Ag Leadersales representative for details.

OnTrac2 Advanced Tab

The Advanced Tab is where you can back up and restore all of your OnTrac2 data.

	Note: OnTrac2 data is stored in internal memory independently of other EDGE data. Thus the backup and restore procedures described in this section both save different data than the EDGE data described in the Console Memory Tab in "Memory Tab" on page 26. Ag Leader recommends that you back up both the EDGE data as well as OnTrac2 data.



Vehicle Database

- **Backup** - This backs up all of your OnTrac2 data in a folder, named **ontrac2,** on the external card.
- **Restore** - This takes the backup you made on your external card and restores it onto the EDGE display.

	Note: Any settings changes (including new vehicles) that you made since your last backup will be deleted when you restore your data.

- **Reset to Defaults** - This deletes all created vehicles and restores settings to defaults.

OnTrac2 Advanced Tab (continued)

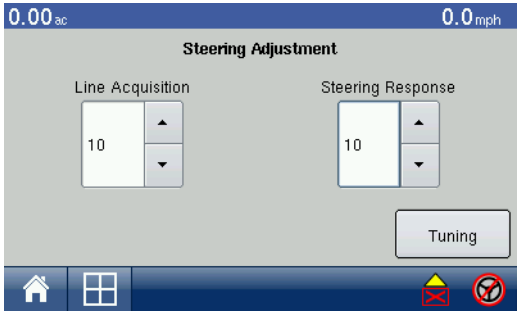
Log Files

- **Copy Logs to Card**- Copies steering logs into the OnTrac2 folder on the external card.
- **Clear** - Clears all steering logs.

OnTrac2 Run Time Environment

Steering Adjustment

The Steering Adjustment screen is where you can adjust Tuning settings as well as the **Line Acquisition Rate** and **Steering Response**. To go to the Steering Adjustment screen, first go to the Map screen and press the Map Options icon. At the Guidance Screen, press the **Adjust Steering** button. The Steering Adjustment screen opens as shown below.



	Note: Adjust Tuning before adjusting the Line Acquisition and Steering Response. For more information, See "Tuning" on page 106.

- **Tuning** - The Tuning process is where you can adjust individual settings for Steering, Heading and Cross-Track Error. For more information, *See "Tuning" on page 106.*
- **Line Acquisition** - Controls the aggressiveness that a vehicle acquires an AB line. Increasing this value will cause the vehicle to take a sharper angle toward the AB line. Decreasing this value will cause the vehicle to approach the AB line at a more gradual angle. The default of this setting is 10; it should remain at 10 before adjusting Tuning settings.

Steering Adjustment (continued)

- **Steering Response** - Controls how well the vehicle holds the AB line. Increasing or decreasing this rate adjusts all three tuning parameters (Motor Aggressiveness, Heading Aggressiveness and Cross-Track Error) simultaneously. Increasing this rate may allow the vehicle to hold the AB line closer; but if adjusted too far it could cause the vehicle to oscillate across the line. Hence, use this adjustment only after the OnTrac2 tuning parameters have been adjusted to their correct values. The default of this setting is 10; it should remain at 10 before adjusting Tuning settings.

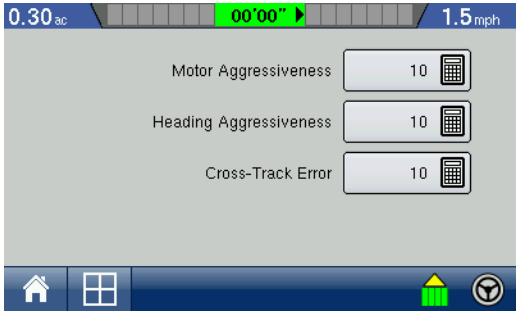
	Note: You can use this adjustment to account for different implements (as some pull harder than others), ground conditions (more or less slippage) or increases and decreases in vehicle speed.

Tuning

The Tuning process is where you can adjust individual settings for **Motor Aggressiveness**, **Heading Aggressiveness** and **Cross-Track Error**. Adjust the tuning parameters in the following order:

1. Set AB Line.
2. Adjust **Motor Aggressiveness**.
3. Adjust **Heading Aggressiveness**.
4. Adjust **Cross Track Error**.
5. Readjust tuning parameters as needed.

	Note: To get an idea of how a parameter will affect how the vehicle drives, set the parameter at a very low value, such as 3 or 4; and then at a very high value, such as 15 or 16. This will give a good indication of how each tuning parameter affects performance.



- **Motor Aggressiveness** - How quickly or aggressively the OnTrac2 Mechanical Drive Unit motor moves the steering wheel. The higher the Motor Aggressiveness Value the more responsive or aggressive the OnTrac2 Mechanical Drive Unit will move the steering wheel. This value is limited by the maximum speed and torque output of the OnTrac2 Mechanical Drive Unit.

	Note: Set this value as high as possible, but if set too high it could cause the steering wheel to oscillate.

Tuning (continued)

- **Heading Aggressiveness** - How accurately the OnTrac2 system's will control the heading or the direction of the vehicle when on the AB line. The higher the Heading Aggressiveness Value the more accurately the system will try to control the actual heading of the vehicle. Heading Aggressiveness should be set as high as possible. If it is set too high, the OnTrac2 system will try and control the vehicle's heading too accurately, and will oscillate across the AB line.

	Note: Heading is very important to the vehicle's ability to maintain an AB line, as it adjusts the vehicle's direction and future location.

- **Cross-Track Error** - Cross Track Error adjusts how close the vehicle holds to the AB line. Increasing Cross Track Error will improve or decrease the amount a vehicle is off the AB line. If it is set too high, the OnTrac2 system will oscillate across the AB line.

How the OnTrac2 System works

Imagine three men in a special tractor cab, called **Steering**, **Heading** and **Cross Track**. The cab on the tractor is special because none of the three men can see outside the windows of the cab. Inside the cab, each man has a unique job and end goal:

- **Steering's** job is to steer the tractor left and right.
- **Heading's** job is to use a compass and measure the difference between the tractor's heading and the AB line heading.
- **Cross Track's** job is to use a measuring tape and to measure how far offline the tractor is from the AB line.

These three men interact with each other to steer the tractor in the following way, keeping in mind they cannot see their steered wheels or where they are headed.

- **Steering** listens to **Heading** and **Heading** listens to **Cross Track,** which issue commands on how far left or right to steer the tractor so that it stays on the AB line.
  - **Steering's** goal: To steer the tractor in a responsive manner, but not in a jerky or lazy way.

- **Heading** tells **Steering** how to steer the tractor left and right in order to minimize the difference between the tractor's heading and the AB Line heading.
  - **Heading's** goal: To minimize the difference in the tractor's heading and the AB Line heading.

- **Cross Track** also tells **Heading** which in turn tells **Steering** how much to steer the tractor left and right in order to minimize the tractor's distance from the AB Line, or its offline distance.
  - **Cross Track's** goal: To minimize the distance between the tractor and the AB Line.

How the OnTrac2 System works (continued)

- **Line Acquisition Mode** is the mode in which the steering controller is in when the OnTrac2 system is driving on the AB Line. The OnTrac2 system comes out of Line Acquisition Mode when the vehicle Cross Track Error is approximately less than six inches for approximately two or more seconds.

	Note: During Line Acquisition (when the vehicle is acquiring the AB line), Steering ignores Cross Track Error, so only Steering and Heading are responsible for getting a vehicle to the AB Line.

	Note: Because of the sequential nature of the 3 men, Cross Track talks to Heading which talks to Steering, in is very important to adjust them in order, Steering first, Heading next and then Cross Track.

How the OnTrac2 System works (continued)

Motor Aggressiveness adjusts how aggressively **Steering** turns the steering wheel left and right. The higher **Motor Aggressiveness** is set, the quicker and more responsive **Steering** turns the steering wheel. The lower the **Motor Aggressiveness** is set, the more lazily **Steering** turns the steering wheel. **Motor Aggressiveness** should be set as high as possible so that the steered wheels move quickly, but not so quickly that the wheels are jittery. See Figure 1 for an example of the desired behavior.

- **Steering's** Simple Analogy: **Motor Aggressiveness** is a setting which varies how responsive or reactive **Steering** is at turning the steering wheel.
  - Too High: If **Steering** is responsive but jittery or jumpy at turning the steering wheel, **Motor Aggressiveness** is too high and should be reduced.
  - Ideal: If **Steering** is responsive and not jittery or jumpy at turning the steering wheel, **Motor Aggressiveness** is set correctly.
  - Too Low: If **Steering** is lazy or not very responsive at turning the steering wheel, **Motor Aggressiveness** is too low and should be increased.

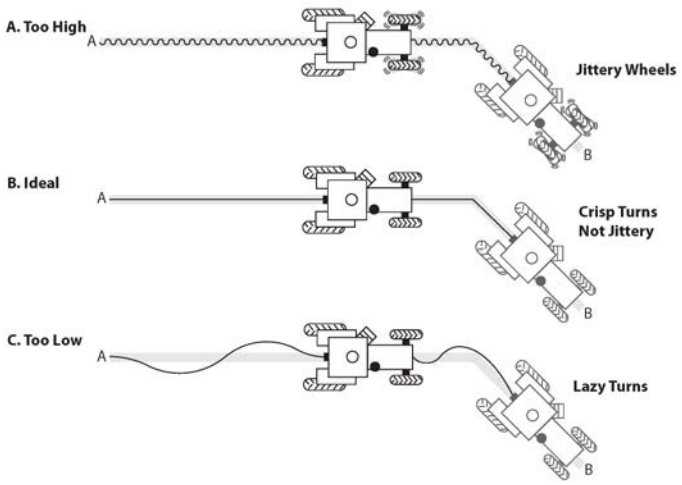


FIGURE 1: MOTOR AGGRESSIVENESS

How the OnTrac2 System works (continued)

Heading Aggressiveness does two things: First, it adjusts how loudly that **Heading** gives commands to **Steering**. Second, it tightens the tolerance which **Heading** tries to keep the tractor's heading within. The higher **Heading Aggressiveness** is set, the louder **Heading** talks to **Steering** and the tighter it tries to keep the tractor's heading tolerance. Lowering **Heading Aggressiveness** lowers the volume at which **Heading** talks to **Steering** and loosens the tractor's heading tolerance. **Heading Aggressiveness** should be set as high as possible so that the tractor does not oscillate or wander across the AB Line. See Figure 2 for an example of the desired behavior.

- **Heading's** Simple Analogy: The **Heading Aggressiveness** setting could be viewed as the volume at which Heading speaks to **Steering**.
  - Too High: If **Heading** speaks "too loudly" to **Steering**, **Steering** over responds to **Heading's** commands and the tractor oscillates across the AB Line. **Heading Aggressiveness** is set too high and should be lowered.
  - Ideal: If **Heading** speaks at the "ideal volume" to **Steering**, **Steering** responds just right to **Heading's** commands, and the tractor does not oscillate or wander across the AB Line. **Heading Aggressiveness** is set correctly.
  - Too Low: If **Heading** speaks "too softly" to **Steering**, **Steering** is not responsive enough to **Heading's** command and the tractor wanders across the AB Line. **Heading Aggressiveness** is set too low and should be increased.

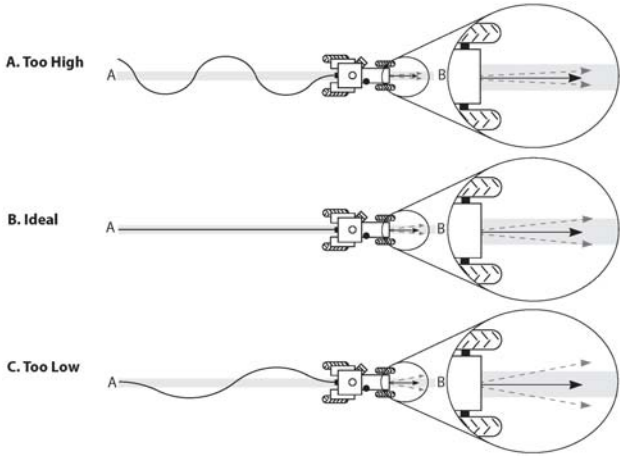


FIGURE 2: HEADING AGGRESSIVENESS

How the OnTrac2 System works (continued)

Cross Track Error also does two things: First, it adjusts the volume at which **Cross Track t**alks to **Steering**. Second, it adjusts the offline tolerance at which **Cross Track** tries to hold the tractor on the AB Line. The higher **Cross Track Error** is set, the louder **Cross Track** talks to **Steering**; and the tighter **Cross Track** tries to hold the tractor to the AB Line. The lower **Cross Track Error** is set, the softer **Cross Track** talks to **Steering**; and the more relaxed **Cross Track** is at holding the tractor to the AB Line. **Cross Track Error** should be set as high as possible so that the tractor stays close to the AB Line, but does not oscillate or wander across the AB Line. See Figure 3 for an example of the desired behavior.

- **Cross Track's** Simple Analogy: **Cross Track Error** could be viewed as the volume at which **Cross Track** talks to **Steering**.
  - Too High: If **Cross Track** speaks "too loudly" to **Steering**, **Steering** over responds to **Cross Track's** commands and the tractor oscillates across the AB Line. **Cross Track Error** is set too high and should be lowered.
  - Ideal: If **Cross Track** speaks at the "ideal volume" to **Steering**, **Steering** responds just right and the tractor does not oscillate or wander across the AB Line. **Cross Track Error** is set correctly.
  - Too Low: If **Cross Track** speaks "too softly" to **Steering**, **Steering** is not responsive enough to **Cross Track** and the tractor wanders across the AB Line. **Cross Track Error** is set too low and should be increased.

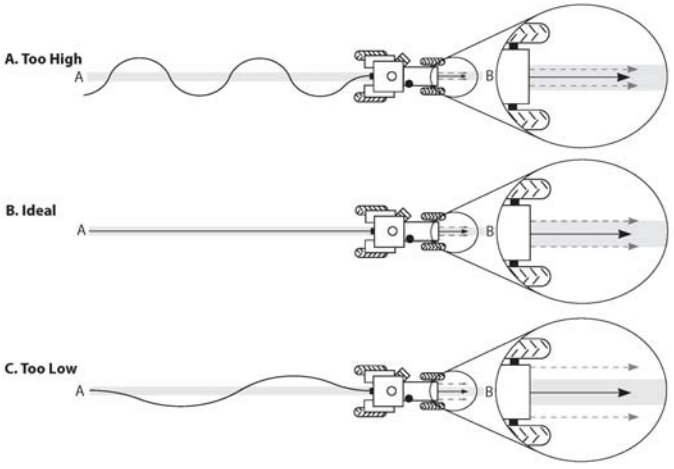


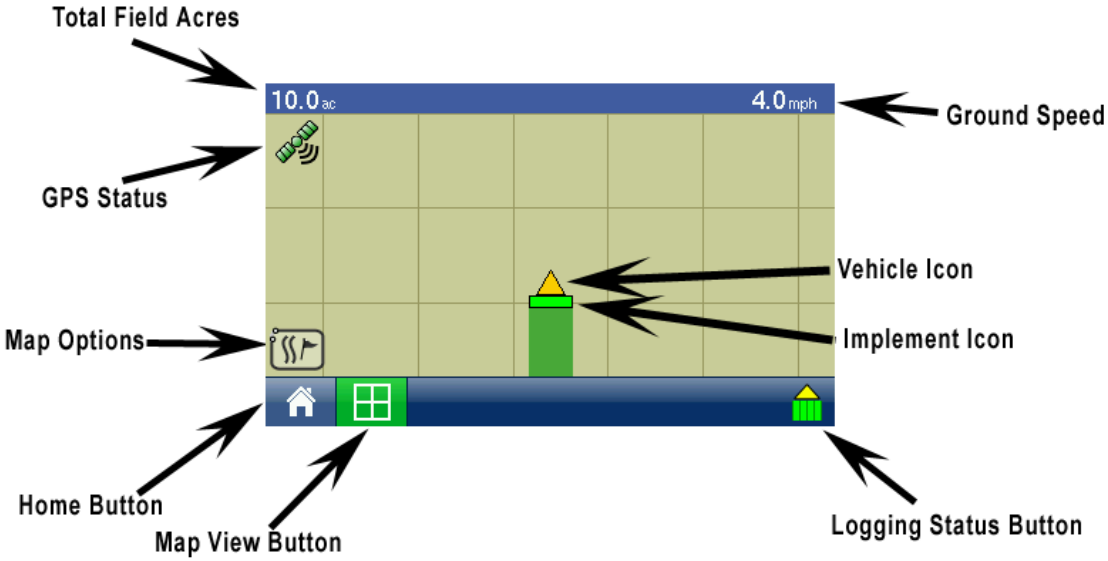
FIGURE 3: CROSS-TRACK ERROR

Tillage

Run Time Environment: Map Screen

The screen shown below is for a Tillage configuration. In order for you to view the Map screen, you must first set up a Grower, Farm and Field at the Start Field Operation portion of the Home screen. For more information, *See "Management" on page 18.* Once a configuration has been completed, the Map View button appears at the bottom of the Home screen. Press the Map View button, and the map screen appears, as shown below.

	Note: Pressing the Map View button will cycle between the available map screen views, and the appearance of the Map View button changes. For information on Map Screen items that are standard for all EDGE operations, see See "Run Time Environment: Map Screen" on page 34.

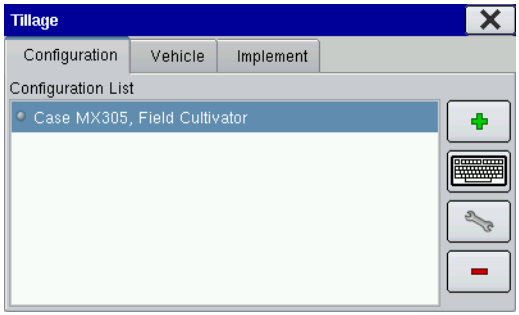


Create a Tillage Configuration

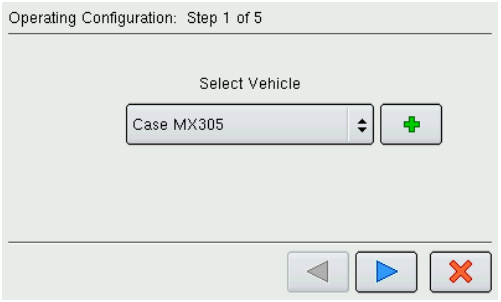
To set up a Tillage configuration, you must first set up Vehicle and Implement with the following procedures.

Create a Configuration

1 At the Setup screen, press the Tillage icon. The Tillage Configuration Tab opens, as shown below.



2 **Press the Add button**. The Operating Configuration Wizard appears, as shown below. Follow the wizard's instructions to complete the configuration.



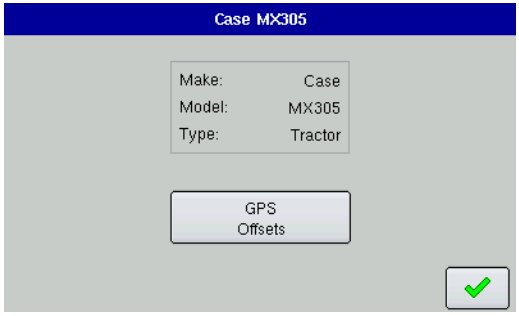
Configuration Notes

If you are not using GPS for ground speed, then the ground speed sensor input must be calibrated for accurate speed and area calculations.

GPS Offsets

After completing the process of setting up a Vehicle, you must configure GPS Offsets. The GPS Offsets define where the machine's rear axle and hitch is in relation to the GPS antenna. These settings are used by mapping .

To configure the GPS Offsets, you must first press the Tillage button and go to the Vehicle Tab. Press on the vehicle name to highlight it, then press the Wrench Button, and the Make/Model/Type screen opens, as shown below.

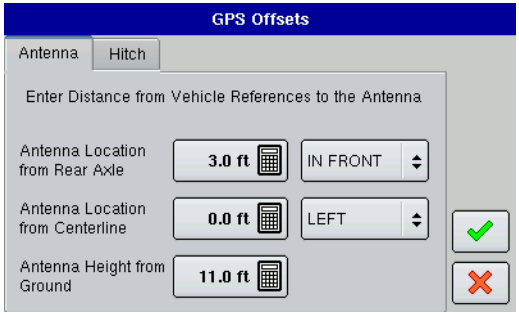


Press the **GPS Offsets** button, and the GPS Offsets screen appears, which has two tabs: **Antenna** and **Hitch**.

GPS Offsets (continued)

Antenna Offsets

The **Antenna** Tab is shown below. This tab contains three different settings:



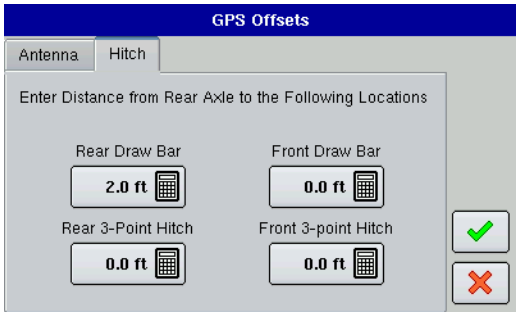
- Measure and enter the horizontal distance from the rear axle to the position of the GPS antenna. Select **IN FRONT** or **BEHIND** to indicate the position of the antenna in relation to the rear axle.
- Measure and enter the horizontal distance from the centerline of the vehicle to the position of the GPS antenna. Select **LEFT** or **RIGHT** to indicate the position from the vehicle centerline.
- Measure and enter the vertical height of the antenna above the ground.

	Note: Accuracy when measuring for a specific setting is essential to ensure proper machine performance.

GPS Offsets (continued)

Hitch Tab Settings

The **Hitch** Tab is shown below.



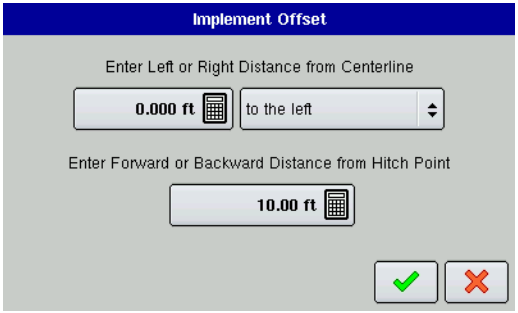
The **Hitch** Tab allows you to enter in the distance from four different mounting positions on the tractor to the rear axle. Use the number pads to enter these values in if using the hitch point.

	Note: Accuracy when measuring for a specific setting is essential to ensure proper machine performance.

Implement Offsets

After completing the initial process of configuring an implement, you must enter accurate values in the Implement Offsets screen. To configure the Implement Offsets, you must first go to the Setup screen, press the Tillage button and go to the Implement Tab. Highlight the implement that you wish to configure, press the Wrench Button, and the Implement Information screen opens.

Press the **Swath Section Offsets** button, and the Implement Offsets screen appears, as shown below.


Implement Offset
Enter Left or Right Distance from Centerline
0.000 ft
to the left
Enter Forward or Backward Distance from Hitch Point
10.00 ft

- Use the first numeric keypad to enter the distance from the mid-point of the swath section to the machine's centerline. Select to the left/to the right to indicate the direction the swath section is located from the vehicle centerline.
- Use the second numeric keypad to enter the distance that the swath section is located from the hitch point. Press the checkmark button when finished.

	Note: Accuracy when measuring and entering implement offsets is required to ensure proper machine performance.

Planting

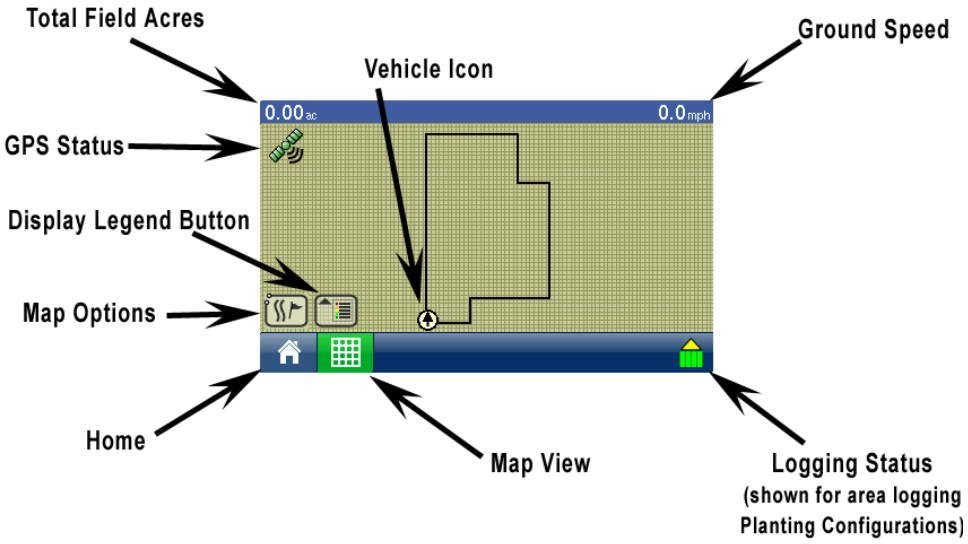
Run Time Environment: Map Screen

The screens shown in this section are for a Planting configuration. In order for you to view the Map Screen, you must first select a Grower, Farm and Field at the Start Field Operation portion of the Home Screen. For more information, *See "Management" on page 18.*

Once a configuration has been completed, the Map View button appears at the bottom of the Home Screen. Press the Map View button, and the Map Screen appears, as shown on the following pages.

Map Screen: Zoom to Extent

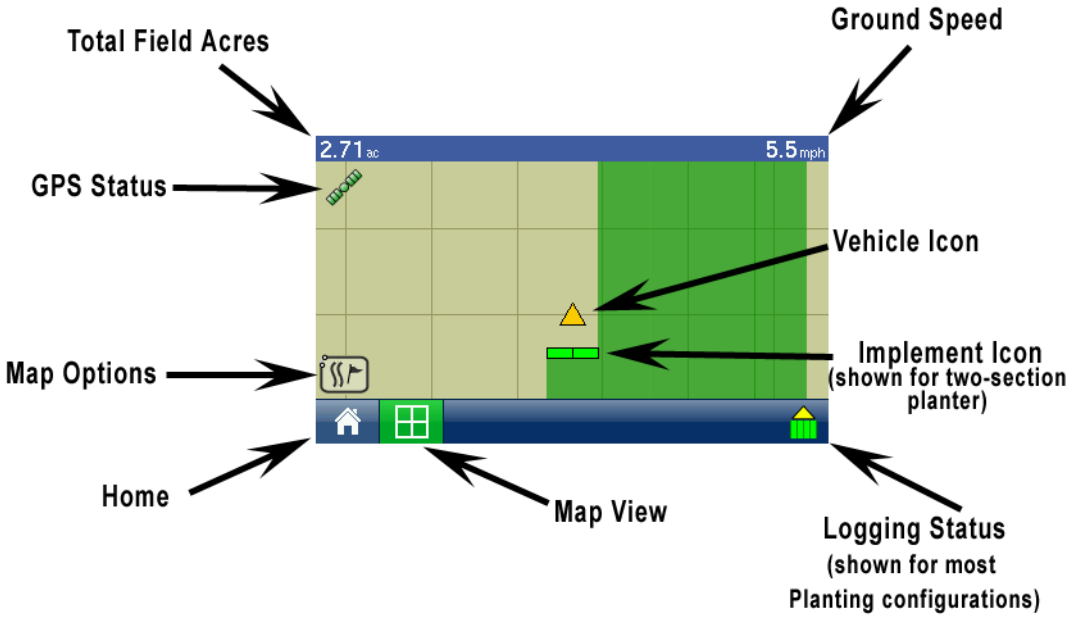
The map below shows a Planting Area Logging configuration, displayed in Zoom to Extent view.



	Note: Pressing the Map View button will cycle between the available map screen views, and the appearance of the Map View button changes.

Map Screen: Zoom Detail

When the Map Screen is shown in Zoom Detail, the Vehicle Icon appears as a gold triangle, rather than an arrow. The map below is shown for a typical Planting Configuration which does not include any Rate Control or Row Shutoff features. This planter includes two sections, and these sections are shown as individual boxes on the Implement Icon behind the Vehicle Icon.



	Note: For information on Map Screen items that are standard for all EDGE operations, See "Run Time Environment: Map Screen" on page 34.

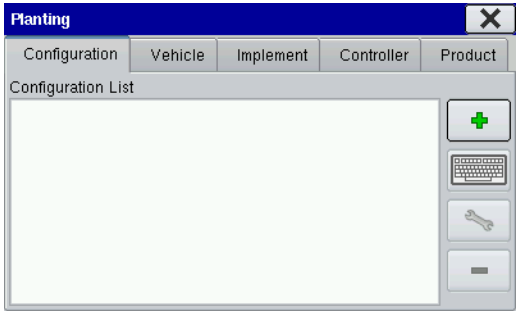
Planting Map Screen Items

The following Planting Map Screen Items are available at the Map Screen:

- **Legend** - During Planting operations, the Map Screen displays three types of items in the Legend: **Rate**, **Varieties** and Prescription (**Rx**). The Legend is only accessible in the Zoom to Extent view. For more information about the Display Legend, *See "Edit Legend" on page 40.*
- **Display Legend icon**- The Display Legend icon makes the Legend appear. When the Legend appears, the arrow points down; when it is turned off the arrow points up. As with the Legend, the Display Legend icon is only accessible in the Zoom to Extent view.
- **Vehicle and Implement Icon** - The vehicle icon shows the vehicle, while the Implement Icon shows the number of sections on the planting implement, as well as the implement's logging status. This item only appears in the Zoom Detail view.
- **Logging Status Button** - This button shows for Planting Operations that are configured for Area Count.

Planting Setup Tabs

Pressing the Planting button at the Setup Screen takes you to the Planting **Configuration** Tab. This Tab is shown in front of four other tabs: **Vehicle**, **Implement**, **Controller** and **Product**.

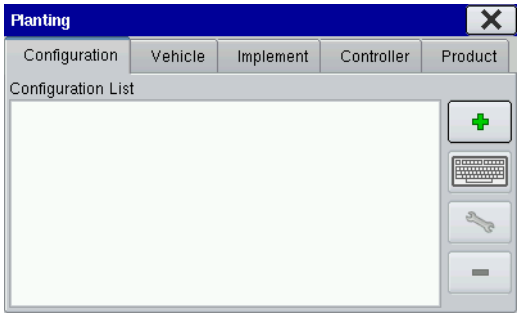


- **Configuration Tab** - The **Configuration** Tab is where you can add and edit operating configurations. For more information, *See "Create a Planting Configuration" on page 124.* and also *See "Configuration Settings" on page 125.*
- **Vehicle Tab** - The **Vehicle** Tab is where you can add and edit vehicles. For more information, *See "Vehicle Tab" on page 133.*
- **Implement Tab** - The **Implement** Tab is where you can add and edit implements. For more information, *See "Implement Tab" on page 137.*
- **Controller Tab** - The **Controller** Tab is where you can add and edit controllers for use during planting. For more information, *See "Controller Tab" on page 139.*
- **Product Tab** - The **Product** Tab is where you can add new products or edit existing products for planting. For more information, *See "Product Tab" on page 141.*

Create a Planting Configuration

To set up a Planting configuration, you must set up Vehicle, Implement, Controller and Products with the procedure described on this and following pages.

1 At the Setup screen, press the Planting button. The Configuration Tab opens, as shown below.



2 **Press the Add button**. The Operating Configuration Wizard appears, as shown below. From here, follow the Wizard's instructions to create a configuration that includes Vehicle, Implement, and Controller settings.

	Note: From the Configuration Tab, you can also: • *Press the on-screen keyboard to edit or rename existing configurations.* • *Press the Wrench button to access Configuration Settings. For more information* *See "Configuration Settings" on page 125.* • *Press the Remove button to remove a configuration. Caution: When deleting a configuration all data logged with that configuration will be deleted.*

Configuration Settings

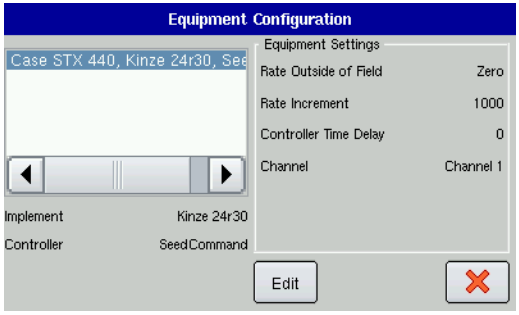
By highlighting a configuration and pressing the Wrench button on the Configuration Tab, you can summon the Configuration Settings screen, where you can edit Configuration Settings, Speed Input Settings, Auxiliary Input Settings and AutoSwath Settings.

- **Configuration Settings** - Press to display and edit planting/seeding settings specific to a vehicle, implement and controller combination. For more information, *See "Configuration Settings: Equipment Configuration" on page 126.*
- **Speed Input** - Press to select speed input device. For more information, *See "Speed Input Settings" on page 127.*
- **Aux Input** - Press to display Auxiliary Input settings. For more information, *See "Auxiliary Input Settings (Switch Mapping)" on page 128.*
- **AutoSwath** - Press to display and edit automatic swath control settings. For more information, *See "AutoSwath" on page 130.*

	Note: You must have an unlock code to activate the AutoSwath feature. If you have been using AutoSwath with the DirectCommand™ system, the feature is already activated and ready to use. If you have not unlocked the AutoSwath feature yet, the code can be purchased through your local Ag Leader dealer

Configuration Settings: Equipment Configuration

The Equipment Configuration screen is shown below. This screen displays the Implement and Controller information. The appearance of this screen may vary, depending upon your particular planting configuration. To edit equipment configuration settings, highlight a configuration and press **Edit**.



Equipment Configuration Settings - SeedCommand

Users of the Hydraulic Drive and Stepper Seed Meter planting configurations may adjust the following settings at this screen:

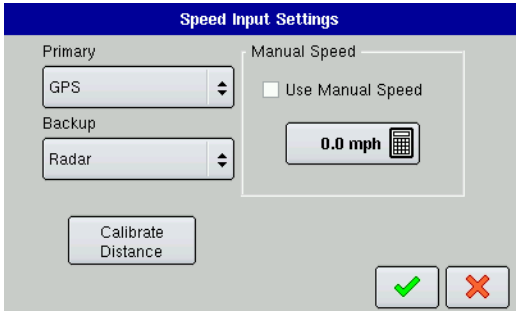
- The **Rate Outside of Field** selection determines product control channel behavior when the field boundary is exited. The drop-down menu includes the following options:
  - **Zero**: Product application will turn off.
  - **Last Good**: Product application will continue at the last value used by the control system.
  - **Rx Default**: Product will be applied at the default rate setting
- The **Rate Display Smoothing** check box determines how the feedback from the control channel rate sensor will be displayed on the Map screen. When de-selected, the system will display raw feedback from the rate sensor. When checked, the system will display the target rate when the actual rate is within +/- 10% of the target rate setting.
- The **Controller Time Delay** setting compensates for any latency in the control system when changing between different product flow rates during variable rate application. A typical setting range for this 0-1 seconds.

Speed Input Settings

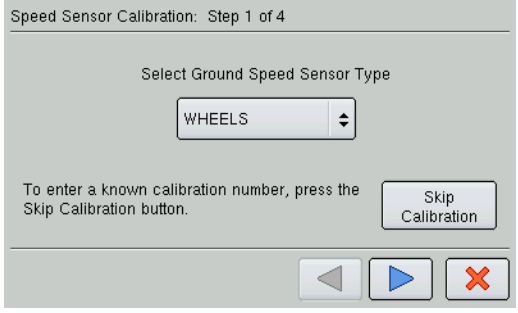
The Speed Input Settings screen is where you can calibrate the ground speed input for accurate speed and area calculations. If you are not using GPS for ground speed, then after you have created a configuration you must calibrate the ground speed input. If you are using GPS, it is recommended to calibrate distance in the event of GPS loss.

Calibrate Distance

1 **Open Configuration Information screen.** On the Configuration Tab, press on the configuration name to highlight it, then press the Wrench Button, and the Configuration Settings screen appears. Press **Speed Input**, and the Speed Input screen appears as shown below.



2 Press the **Calibrate Distance** button, and the Speed Sensor Calibration wizard appears, as shown below.

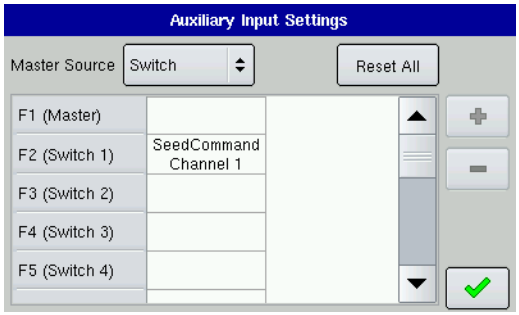

Speed Sensor Calibration: Step 1 of 4
Select Ground Speed Sensor Type
WHEELS
To enter a known calibration number, press the Skip Calibration button.
Skip Calibration

3 From here, follow the on-screen wizard's instructions to complete the distance calibration procedure.

Auxiliary Input Settings (Switch Mapping)

To view Auxiliary Input Settings, go to the Planting Configuration Tab, highlight the desired configuration and press the Wrench button. At the Configuration Settings screen, press the **Aux Input** button, and the Auxiliary Input Settings screen appears, as shown below.

This Switch Mapping function is active only for users with DirectCommand or SeedCommand features. The Auxiliary Input Settings screen displays settings for the Master Switch and other switches on a SeedCommand Switch Box.



The Master Source drop down menu controls the master switch for your entire configuration. You may see the following options underneath this menu:

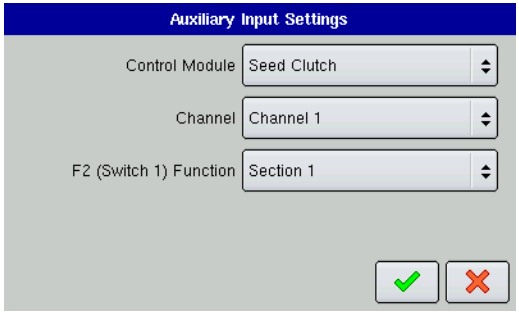
- **Switch** - Controls the master switch.
- **External 2** - This setting can control an optional, floor-mounted master switch.
- **External 1, 3** & **4** - Not used at this time.

The F1-F11 cells can be assigned to any implement sections. You can use these to choose the switches that control a particular section or controller planting clutch. From here, you can also make the following changes to the switch settings.

- Add a switch setting. For more information, *See "Add Auxiliary Input Settings" on page 129.*
- Remove a switch setting.
- **Reset All**. This resets the settings to defaults.

Add Auxiliary Input Settings

If you wish to add a switch setting, press the Add button on the Auxiliary Input Settings Screen, and a second Auxiliary Input Settings screen appears, as shown below. This screen shows the following drop down menus:



- **Control Module** - Specifies the function of your DirectCommand or Planting Row Shutoff.(For example, Seed Clutch).
- **Channel** - Select the channel to control.
- **F2 Switch 1** - Selects the section to turn on and off.

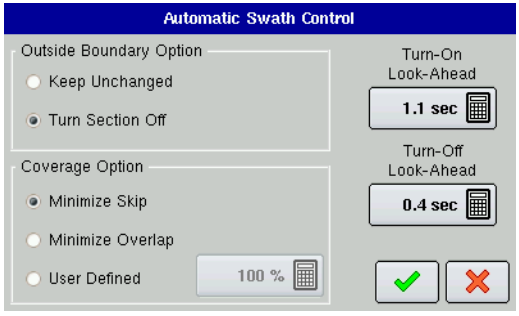
AutoSwath

The Automatic Swath Control feature turns sections off and on automatically based upon the following conditions:

- Entering and exiting internal and outer field boundaries.
- Entering and exiting previously-applied areas within a field.

To access the Automatic Swath Control settings, go to the Configuration Tab, highlight a configuration and press the Wrench button. Once the Configuration Settings Screen appears, press the **AutoSwath** button. The Automatic Swath Control screen appears, as shown below. This screen displays Automatic Swath Control settings that are specific to that operation.

	Note: The Automatic Swath Control functionality is an optional feature of both the DirectCommand and SeedCommand Systems. An unlock code must be purchased and installed to enable this feature. Call your local Ag Leader dealer for details and pricing.



- **Turn-On Look Ahead** - This setting determines how far ahead the system looks to turn the sections back on. This setting compensates for delay in the planting control system when the implement sections are turned on. To see what these numbers should look like for Row Shutoff Modules, *See "Row Shutoff Look-Ahead Numbers" on page 157.* of the SeedCommand subsection.

AutoSwath (continued)

- **Turn-Off Look Ahead** - This setting determines how far ahead the system looks to turn the sections off. This setting compensates for delay in the product control system when the sections are turned off. To see what these numbers should look like for Row Shutoff Modules, *See "Row Shutoff Look-Ahead Numbers" on page 157.* in the SeedCommand subsection.
- **Outside Boundary Option** - Select one of the two options to determine system behavior when a section exits a field boundary.
- **Coverage Option** - In the Coverage Option area, you must choose between three options:
  - The **Minimize Skip** option turns off the implement section after the entire section is fully inside your coverage area. This prevents the possibility of skips.
  - The **Minimize Overlap** option turns off the implement section when that section first enters your coverage area. This prevents the possibility of overlaps.
  - The **User Defined** option allows you to choose what percentage of the implement section is within the coverage area before that section turns off. For example, if you choose 70%, then the section will switch off when half of it is within your coverage area.

AutoSwath Notes

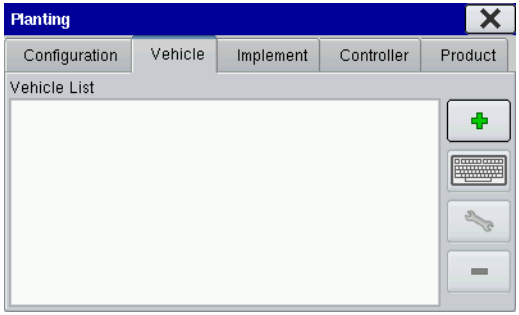
To use AutoSwath for planting operations, you are required to use a 5 Hz or higher GPS output rate. AutoSwath control will not allow sections to be turned on until the master and planting section switches are on. If you have less than a 5 Hz GPS output rate and you select AutoSwath, a warning appears, telling you that AutoSwath Control is not available at less than 5 Hz.

Fixing Overplanting and Underplanting in AutoSwath

AutoSwath Function	Problem	Recommended Action	Result
Turn Off Look-Ahead	**Overplanting**	*Increase* look-ahead number	The AutoSwath anticipates headlands sooner and turns the planter off sooner.
	Underplanting	*Decrease* look-ahead number	The AutoSwath anticipates headlands later and turns the planter off later.
Turn On Look-Ahead	**Overplanting**	*Decrease* look-ahead number	The AutoSwath anticipates headlands later and turns the planter on later.
	Underplanting	*Increase* look-ahead number	The AutoSwath anticipates headlands sooner and turns the planter on sooner.

Vehicle Tab

The Vehicle Tab provides functionality for setting up and configuring vehicles. The vehicle list will show any vehicles that have already been created.



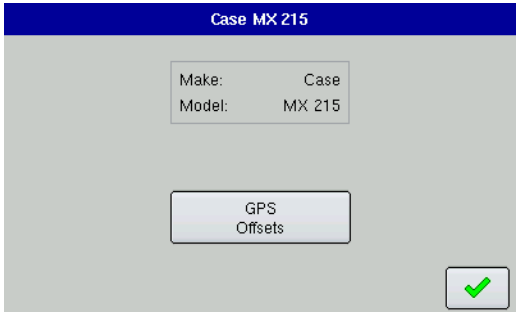
- **Add** - The Add button allows you to add a new vehicle. A wizard will walk you through the vehicle setup process.
- **Keyboard Button** - The Keyboard button allows you to edit the name of a vehicle in the list. To edit, highlight the name of a vehicle in the list and then press this button.
- **Wrench Button** - The Wrench Button button opens the Vehicle Settings Screen, where you can configure GPS Offsets. For more information, *See "GPS Offsets" on page 134.*
- **Remove** - The Remove button allows you to remove a vehicle.

	Note: If a vehicle is deleted, all data in the regions and configurations using it will be deleted.

Vehicle Tab (continued)

GPS Offsets

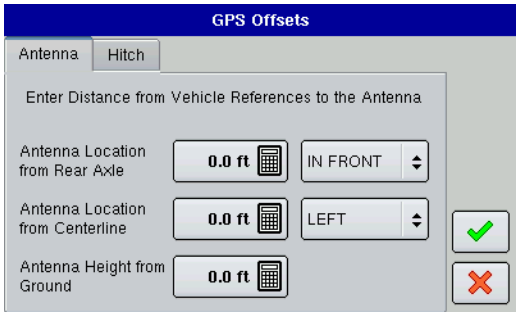
After completing the process of setting up a Vehicle, you must also configure GPS Offsets. The GPS Offsets define where machine rear axle, hitch, and product placement is in relation to the GPS antenna. These settings are used by mapping, product control, and Automatic Swath Control.



Press the **GPS Offsets** button to view **Antenna** and **Hitch** Tab GPS settings. More information can be found at *"Antenna Tab" on page 135* and also *"Hitch Tab" on page 136*.

GPS Offsets (continued)

Antenna Tab



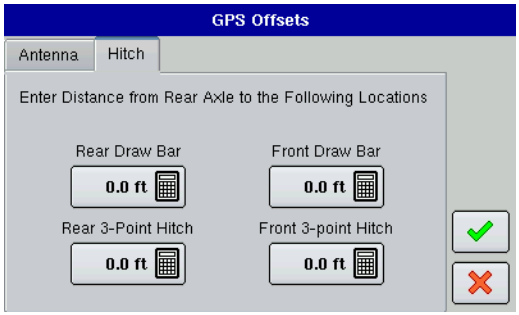
The Antenna Tab contains three different settings.

- Measure and enter the horizontal distance from the rear axle to the position of the GPS antenna. Select **IN FRONT** or **BEHIND** from the list box to indicate the position of the antenna in relation to the rear axle.
- Measure and enter the horizontal distance from the centerline of the vehicle to the position of the GPS antenna. Select **LEFT** or **RIGHT** to indicate the position from the vehicle centerline.
- Measure and enter the vertical height of the antenna above the ground.

	Note: Accuracy when measuring for a specific setting is essential to ensure proper machine performance.

GPS Offsets (continued)

Hitch Tab

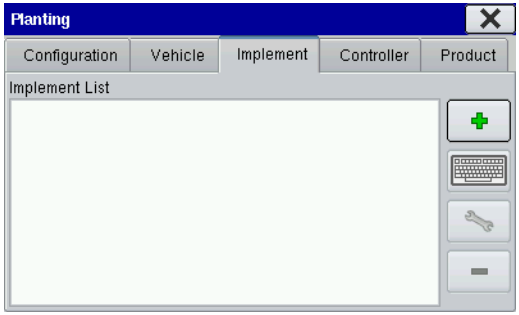


The Hitch Tab allows you to enter in the distance from one of four different mounting positions on the tractor to the rear axle. Use the Number Pads to enter a value in for the respective hitch point.

	Note: Accuracy when measuring for a specific setting is essential to ensure proper machine performance.

Implement Tab

Individual implements are set up and configured from the Implement Tab. The Implement List displays all previously-configured implements that are available for use.



- **Add** - Press to add a new implement. A wizard will walk you through setting up the implement.
- **Keyboard Button** - Press to edit the name of a selected implement from the list.
- **Wrench Button** - Press to edit the Swath Section Offsets. For more information, *See "Implement Offsets" on page 138.*
- **Remove** - Press to remove a selected implement.

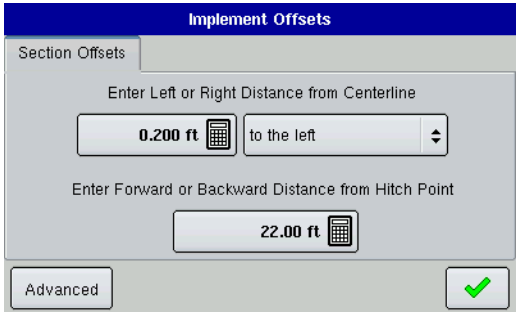
	Note: When deleting an implement all data in the regions and configurations using it will be deleted!

Implement Offsets

After you complete the initial process of configuring an Implement, you must enter accurate values in the Section Offsets to ensure proper machine performance. Section Offsets are configured as outlined in the following steps.

Section Offsets

1 **Press Wrench Button.** On the Implement Tab, highlight the Implement Configuration, press the Wrench Button, and the Implement Offsets screen appears, as shown below.



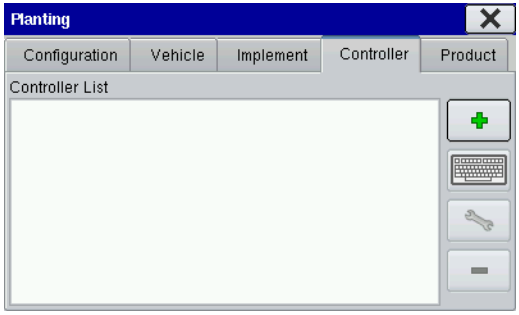
2 **Enter left or right distance from hitch point**. Use the numeric keypad to enter the distance of the midpoint of the swath section from the machine centerline. Select **Left** or **Right** to indicate the direction the swath section is located from the vehicle centerline.

3 **Enter Forward or Backward Distance from Hitch Point.** Use the numeric keypad to enter the distance from the front or back of the hitch point. Press the checkmark box when complete.

Controller Tab

Use the Controller Tab to add and configure SeedCommand controllers for use during SeedCommand planting operations.

	Note: No settings are available under the Controller Tab that pertain to Area Logging (non-SeedCommand) planting operations.

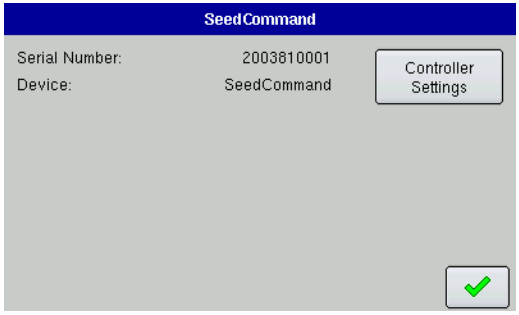


- **Add** - Press to add a new controller. A wizard will walk you through setting up the controller.
- **Keyboard Button** - Press to edit the name of a selected controller from the list.
- **Wrench Button** - Press to edit Controller Settings, including tabs for Channel 1, 2 & 3 settings, and also Auxiliary settings. For more information *See "Controller Settings (SeedCommand)" on page 140.*
- **Remove** - Press to remove a controller.

	Note: When deleting a controller all data in the regions and configurations using it will be deleted.

Controller Settings (SeedCommand)

To view Controller Settings, go to the Planting Controller Tab, highlight the controller, press the Wrench Button, and the Controller Settings screen shows as appears below. The current Device and Serial Number of that Device is displayed.

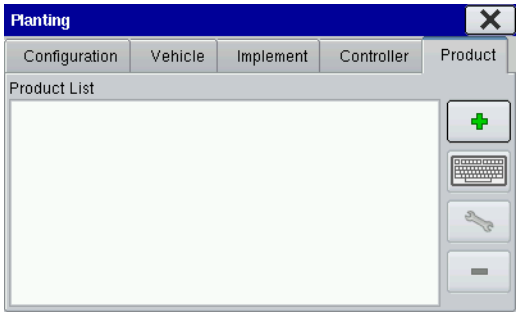


Press the **Controller Settings** button and another Controller Settings screen opens, where you can view controller settings. The appearance of this Controller Setting screen varies, depending upon your SeedCommand configuration. For more information, see the following in the Planting: SeedCommand subsection:

- To view Controller Settings for Hydraulic Seed Rate Controller Drives, *See "Controller Settings for Hydraulic Seed Rate Motor Drives" on page 162.*
- To view Controller Settings for Stepper Seed Rate Motor Drives, *See "Controller Settings for Stepper Seed Rate Motor Drives" on page 171.*

Product Tab

The Product Tab allows you to add new products or edit existing products for planting and seeding.



- **Add** - The Add button summons the Product Options screen, where you can add or import a product. For more information, *See "Product Options" on page 142.*
- **Keyboard Button** - Press to edit the name of a selected product from the list.
- **Wrench Button** - Press to view product manufacturer, edit product type, edit product color or edit map legend. For more information, *See "Product Settings" on page 145.*
- **Remove** - The Remove button allows you to remove a product.

	Note: When deleting a product all data using it will be deleted.

Product Options

To add or import a product, press the Add button located on the Product Tab. The Product Options screen appears, as shown below.

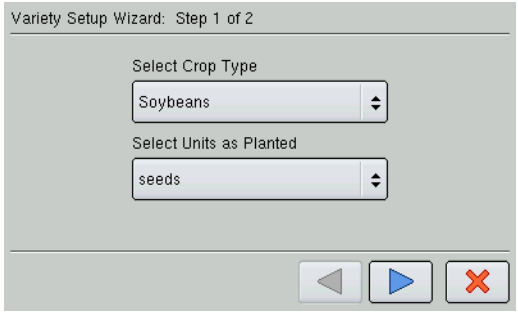
- **Add Product** - The **Add Product** button summons the Variety Setup Wizard. For more information, *See "Add Product" on page 143.*
- **Import Product** - The **Import Product** button summons the Product Import Wizard, For more information, *See "Import Product" on page 144.*

Product Options (continued)

Add Product

To add a new product, press the **Add Product** button on the Product Options screen. The Variety Setup Wizard appears, as shown below.

1 **Select Crop Type**. Select a **Crop Type** and the **Units As Planted** from the drop down menus.



2 **Enter Variety Information**. Use the on-screen keyboards to enter the manufacturer name and the variety or hybrid. Only the variety or hybrid name is required. Press the checkmark box when complete.

Product Options (continued)

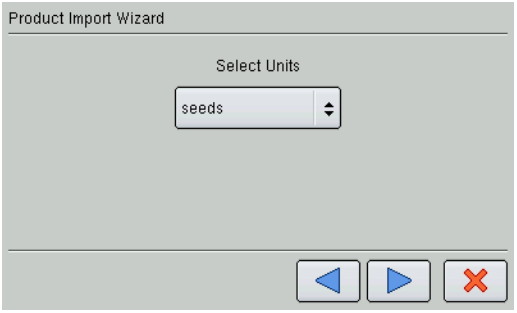
Import Product

	Note: To import a product from a desktop .msf file, you must first have created an .msf file that includes Grower, Farm and Field information. To do this, *See "Importing an .MSF File" on page 19.*

To import a product from a desktop .msf file, go to the Product Tab and press the Wrench button. When the Product Options screen appears, press the **Import Product** button. The Product Import Wizard appears, as shown below.

1 **Select Product and Type**. Select the Product and Type from the drop-down menus.

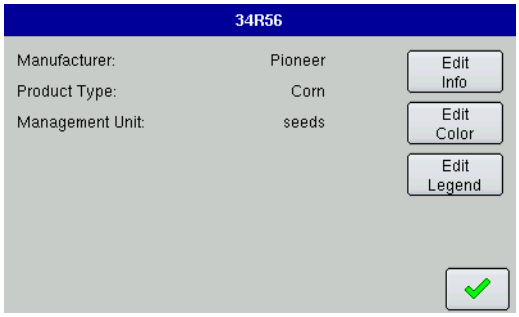
2 **Select Units**. Select the units of the product.



3 Follow the steps in the Wizard to complete the procedure.

Product Settings

The Product Settings screen is where you can edit product information, add a color or edit the legend. To view the Product Settings screen, go to the Product Tab and press the Wrench button.



- **Edit Info** - The **Edit Info** button summons a second Product Settings screen, where you can specify or change the manufacturer of a specific variety.

- **Edit Color** - The **Edit Color** button summons the Color Selection screen, where you can change the color associated with a product.

- **Edit Legend** - The **Edit Legend** button allows you to change the map legend associated with a specific product. Product Settings (continued)

Planting: SeedCommand™ Machine-Specific Setup

SeedCommand, Ag Leader's planter control system, automatically turns individual planter sections on and off, based on a coverage map. The EDGE display includes options for four separate SeedCommand features: AutoSwath, Planter Row Shutoff, Hydraulic Seed Rate Control and Stepper Seed Rate Control. This subsection describes the following features:

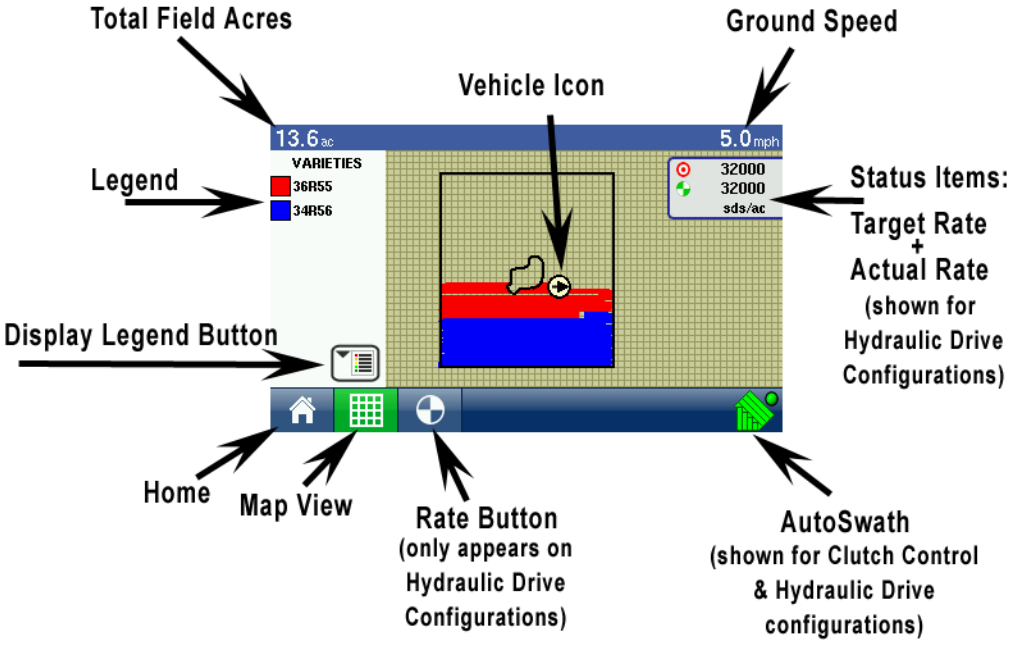
- **Map Screen** functions, beginning on *"Map Screen: Zoom to Extent" on page 148*
- **Rate Screen** functions, beginning on *"Run Time Environment: Rate Screen" on page 151*.
- **Planter Row Shutoff** functions, beginning on *"Row Shutoff" on page 154*
- **Hydraulic Seed Rate Control** functions, beginning on *"Hydraulic Seed Rate Control" on page 160*.
- **Stepper Seed Rate Control** functions, beginning on *"Stepper Seed Rate Control" on page 169*.

	Note: For information on AutoSwath functionality, see the pages beginning at "AutoSwath" on page 130 of the Planting section.

	Note: Additionally, consult "Auxiliary Input Settings (Switch Mapping)" on page 128 of the Planting section for information on the Auxiliary Input Settings (Switch Mapping) feature.

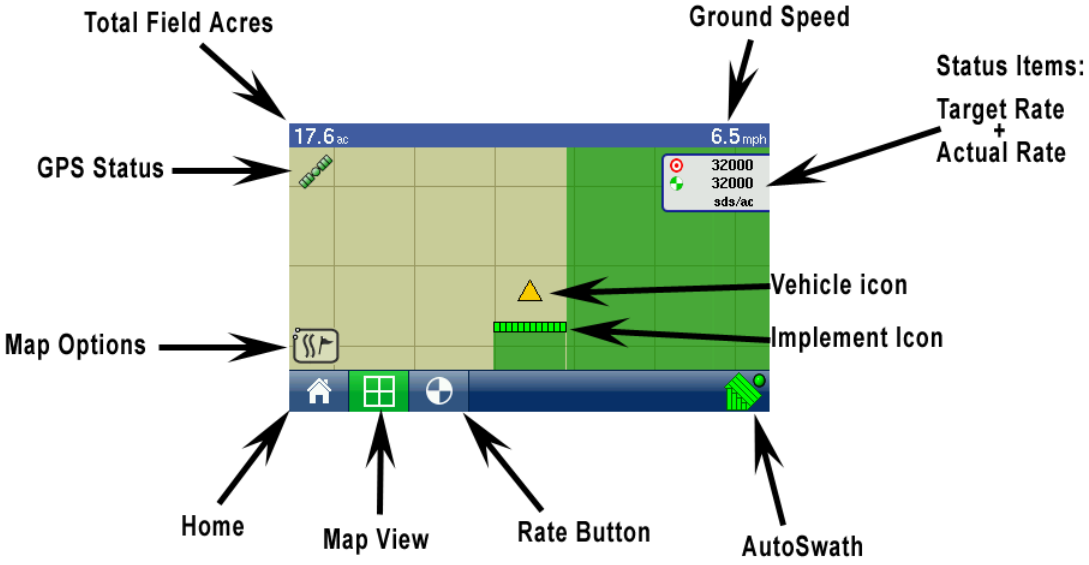
Map Screen: Zoom to Extent

The map below is shown for a SeedCommand configuration running a Row Shutoff Module and Planter Hydraulic Drive Control.



Map Screen: Zoom Detail

The map below is shown for a Planter with SeedCommand features. This planter includes 12 sections, and these sections are shown as individual boxes on the Implement Icon behind the Vehicle Icon.



Planting Map Screen Items

The following Planting Map Screen Items are available for SeedCommand users at the Map Screen:

- **Status Items: Target Rate and Actual Rate** - Two items, Target Rate and Actual Rate, appear in the Status Items box at the top right-hand corner of the Map Screen. As with the Legend, the Status Items are only accessible in the Zoom to Extent view.

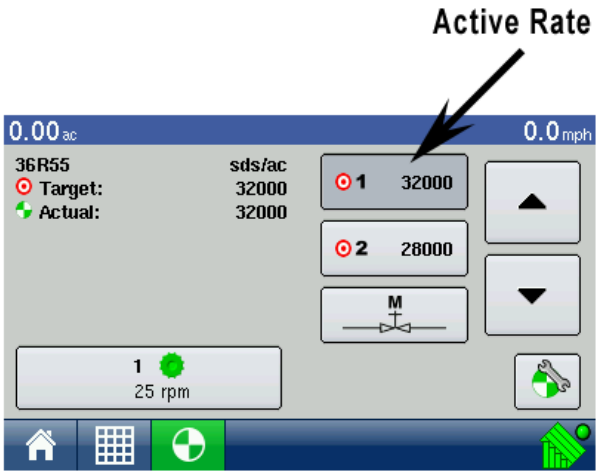
- **Rate Button** - This only appears on Hydraulic Drive configurations. For more information, *See "Run Time Environment: Rate Screen" on page 151.*

- **AutoSwath Button** - This button appears for all SeedCommand configurations, including Row Shutoff and Hydraulic Drive configurations. For more information, *See "Run Time Environment: Rate Screen" on page 151.*

	Note: For an explanation of display items not listed above, *See "Map Screen Icons" on page 37.*

Run Time Environment: Rate Screen

You can view the Rate screen by pressing the Rate button, as shown at left. The Target Rate screen will appear for all target rates being applied. Items that appear on this screen are explained on this and the following pages.



- **Target Rate** - The Target Rate is the amount of seeds that you wish to plant.
- **Actual Rate** - The Flow Sensor returns the actual rate of the seeds that you are planting.

	Note: In some conditions, the Actual Rate may increment slower than the Target Rate, or its numeric values may vary before matching the Target Rate.

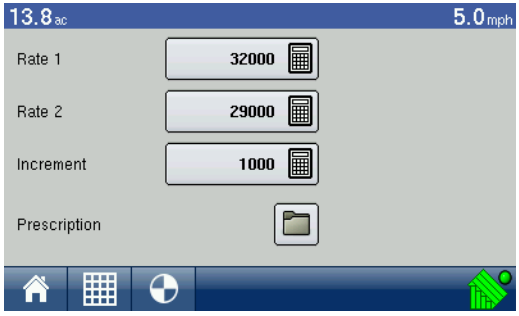
- **Meter RPM**- The Meter RPM button, as shown at left, displays the number of hydraulic motors and their speed, shown in Revolutions Per Minute (RPM). Pressing the Meter RPM button summons the Seed Rate Planter Control Screen, where you can calibrate and prime the seed meters. For more information, see *"Priming Seed Rate Meters" on page 179* and *"Calibrating Seed Rate Meters" on page 180*.

Run Time Environment - Rate Screen (continued)

- **Rate 1 and Rate 2 Settings** - The Rate 1 and Rate 2 settings represent preset planting rates that allow operators to quickly change between desired planting rates for each individual product. The active rate button appears with a gray background behind it.
- **Manual Valve Control** - The Manual Valve Control button (shown at left) The Manual Valve Control button allows operators to specify the position of the control valve. Operators use this option to prime the system before application or clean out equipment at the end of the day.

Planting Rate Control Configuration Screen

Planting Rate Control Configuration Button - The Planting Control Configuration button, which appears on the Rate Screen as shown at left, summons the Planting Rate Control Configuration, shown below.



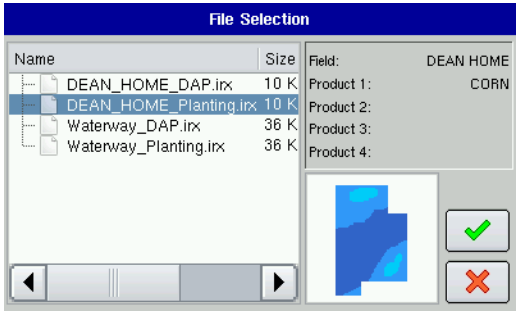
- **Rate 1 & Rate 2** - The Rate 1 and Rate 2 settings represent preset application rates that allow operators to quickly change between desired target rates for each individual product. Use the numeric keypad to enter the desired amount.
- **Increment** - The Increment button allows operators to specify the increase or decrease amounts used when Rate 1 or Rate 2 is selected. Use the numeric keypad to enter the desired increment.
- **Prescription** - To load a map-based prescription file, press the **Prescription** button. For more information, *See "Loading Prescriptions" on page 153.*

Loading Prescriptions

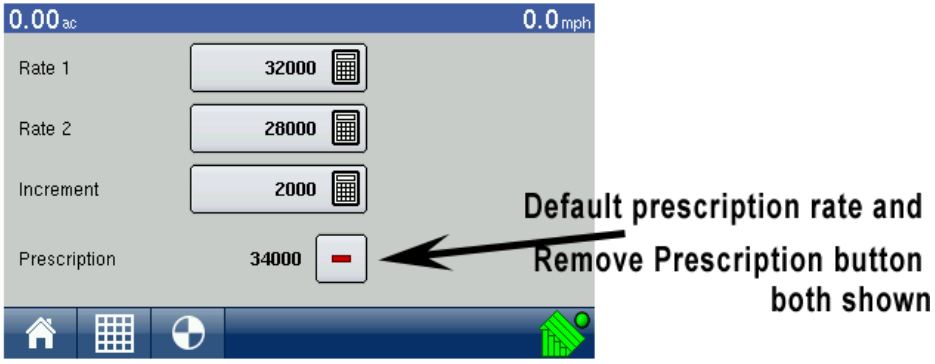
To load a map-based prescription file, go to the Rate Screen, press the Planting Configuration button and the Planting Rate Control Configuration screen appears.

1 Press the Prescription button, as shown at left. The File Selection screen opens, as shown below.

2 Choose an .irx (prescription) file from the names list. Press the checkmark box when complete.



3 Once selected, the Prescription button on the Planting Rate Control Configuration Screen will change its appearance to the Remove Prescription button, which appears as a minus sign. This will allow you to clear out the selected prescription. (For an example, see below).



Row Shutoff

By configuration your EDGE display with Row Shutoff, you can start and stop seed flow and control planter sections row-by-row, allowing AutoSwath Control to automatically turn planter row units on and off based on your planting map.

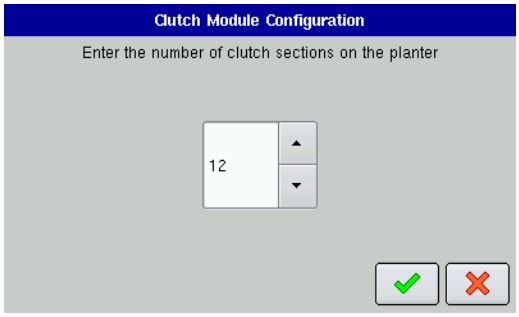
Row Shutoff Configuration

Press the Planting button at the Setup Screen and go to the Planting Configuration Tab.

1. **Create or add a vehicle**. Follow the on-screen wizard to set up a vehicle.
2. **Add Implement**. After you have completed the vehicle configuration, the Implement Attachment Wizard appears. Add a new implement, and select the implement attachment method.
3. **Select Implement Options**. Use the drop-down menu to select the planter or seeder type, and press the blue right-arrow button to continue. Check the **Planter Section Row Shutoff** checkbox to enable Row Shutoff functionality.
4. **Enter Number of Rows and Spacing**. Use the up and down arrows to enter the number of rows and spacing, and press the blue right-arrow button to continue.

Row Shutoff Configuration (continued)

5 **Enter Number of Implement Section(s)**. Use the up and down arrows to enter the number of clutch sections, and press the blue right-arrow button to continue.



	Note: Do not enter the number of individual rows. Enter the number of swath sections that can be independently turned on and off.

6 **Enter Section Widths from Left to Right**. The Enter Section Widths from Left to Right screen appears. This screen shows the number of sections and number of rows in your configuration. From here you can:

- Press **Next**, or
- Highlight the section number, and use the numeric keypad to change the section row numbers; then press the blue right-arrow button to continue.

	Note: The implement is divided up into equal section sizes by default. To modify the sections, press the keypad button for each section that needs to be changed.

7 **Enter Distance from Hitch to Application Point**. Use the numeric keypad to enter the distance from the implement hitch to the application point (from front to back). When finished, press the blue right-arrow button to continue.

Row Shutoff Configuration (continued)

8 **Enter Implement Name**. Use the numeric keypad to enter a name for the implement, and press the check mark box.

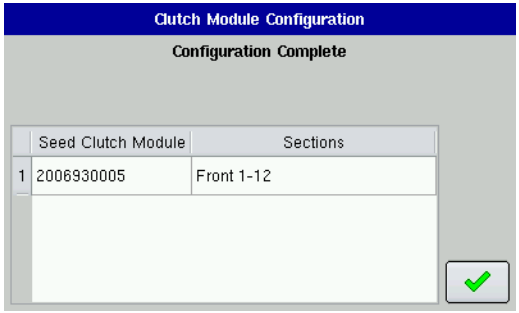
9 **Enable Seed Row Shutoff**. On the Implement Tab, first highlight the desired implement from the Implement List, then check the **Enable Seed Row Shutoff** check box. Next, press the **Configure Clutch Modules** button.

	Note: You must have the Enable Row Shutoff Module check box selected in order to have the Configure Row Shutoff button enabled.

10 **Enter number of clutch sections**. Once you have pressed the Configure Clutch Modules button, the Clutch Module Configuration box appears. Enter the same number of clutch sections that you specified in **Step 5**; then press the checkmark box.

Row Shutoff Configuration (continued)

11 Configuration Complete. The configuration appears, as shown below.



	Note: The Clutch Module Configuration must match the actual number of clutch sections on the planter. Otherwise, you will see a message stating that "The number of detected module outputs does not equal the number of planter sections." (This message may also appear if you have not connected the clutches to the module).

Row Shutoff Look-Ahead Numbers

This table references the Turn-On Look-Ahead and Turn-Off Look-Ahead numbers for both Electric Clutch and Air Row Shutoff Modules.

Planter Unit Seed Meter Type	On/off	Electric Clutch	Air Clutch
Finger Units	Turn On	0.9	1.1
	Turn Off	0.3	0.3
Vacuum	Turn On	0.9	1.1
	Turn Off	0.4	0.4

	Note: Using the above settings will produce accurate field results. However, small gaps may appear on the display. (An example is shown at "If Gaps Appear on the On-Screen Map" on page 159). These gaps do not reflect actual machine performance or log data.

Checking AutoSwath Performance for Row Shutoff

The settings given in the above AutoSwath look-ahead table shown previously have been tested with each clutch and seed meter combination to work for your planter. However, if you are looking for a method to verify the performance of SeedCommand, then you should attempt the following procedure:

1. Stop the planter within 20 feet of the planted headland.
2. Select one row unit from each planter swath section to observe.
3. Remove the down pressure from the closing wheel of each selected row unit.
4. Hold the closing wheels off the ground by attaching a chain or strap from the hopper support panel to the closing wheel arm. (This prevents the closing wheels from closing the seed trench).

Securing these closing wheels up allows you to observe the planted seed in the trench so that you can observe when the EDGE display is turned off and on during the seed application.

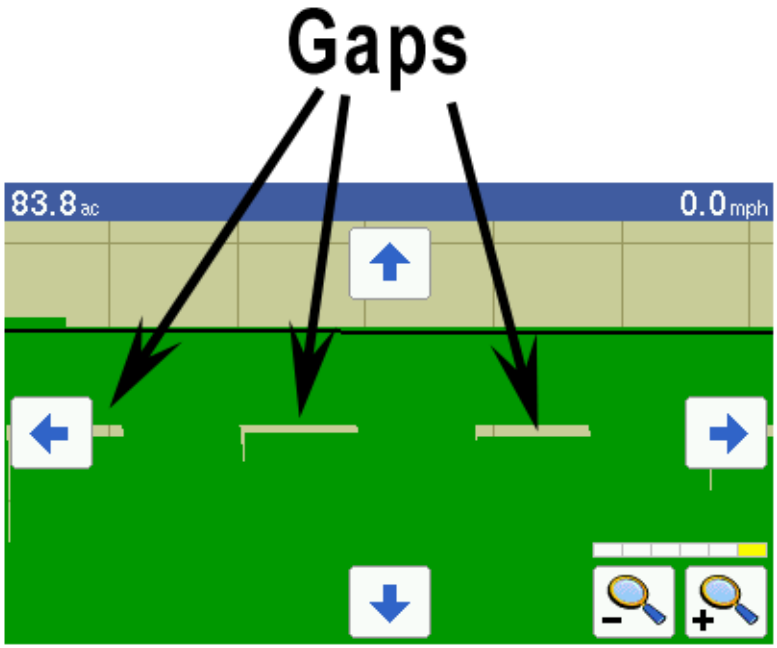
5. Resume planting in your normal fashion, then stop when you are 20 feet out of the headland of the next pass.
6. Stop the planter and observe the AutoSwath shutting off and turning on to see if the results are acceptable.

- If the results are correct, then return the closing wheels to their previous operational state. Close the seed trench on the observed rows and return to planting.
- If you suspect the results are incorrect, then adjust the appropriate look-ahead setting one-tenth (.1) second per trial. When making changes to the look-ahead settings, make sure to adjust these settings only one-tenth (.1) second per trial. Larger adjustments can cause unintentional large changes in the AutoSwath's performance. When adjusting the look-ahead numbers from the suggested settings, it is recommended that you observe multiple trials to confirm the operations' accuracy.
- If you encounter overplanting or underplanting problems, *See "Fixing Overplanting and Underplanting in AutoSwath" on page 132.*

If Gaps Appear on the On-Screen Map

When operating AutoSwath, do not make changes to the look-ahead settings based on data from the on-screen map. The look-ahead settings in the Planter Unit Seed Meter Type table were created from field testing and machine observations to determine the appropriate settings for each combination of clutch and seed meter. These should be accurate settings unless your planter has been modified. Small skips and overlaps in the map may be expected but should not require you to adjust settings without first observing your machine's performance.

To determine if a setting change is necessary, perform the procedure detailed in *"Checking AutoSwath Performance for Row Shutoff" on page 158* to observe the actual machine performance. Following this procedure will give you additional data to use with that already received from the on-screen map.



Hydraulic Seed Rate Control

The Hydraulic Seed Control Module is a SeedCommand™ product that allows users to control up to three hydraulic motor drives via the EDGE™ display. Configure the Hydraulic Seed Rate Control module in the following order.

1 **Configure Hydraulic Seed Rate Control module**. See *"Hydraulic Seed Rate Control Configuration" on page 161*.

2 **Enter Controller Settings**, including the Max Meter Speed, Gear Ratio and Minimum Allowable Ground Speed. See *"Controller Settings for Hydraulic Seed Rate Motor Drives" on page 162*.

3 **Prime the Hydraulic Seed Meter**. This fills the seed meter with seed, and thus allows you to avoid skips in your field. See *"Priming Seed Rate Meters" on page 179*

4

- **a. Enter Meter Calibration Number**. This number, representing seeds per revolution, is set according to the number of seed dropped per one revolution of the seed meter. For more information, *"Calibrating Seed Rate Meters" on page 180*.
- **b. Perform a Seed Meter Calibration** (not always required). A new calibration should be performed if your as-applied seed rate does not match the actual population planted. For more information, *"Calibrating Seed Rate Meters" on page 180*.

Hydraulic Seed Rate Control Configuration

Press the Planting button at the Setup Screen and go to the Planting Configuration Tab.

1 **Create or add a vehicle**. Follow the on-screen wizard to set up a vehicle.

2 **Add Implement**. After you have completed the vehicle configuration, the Implement Attachment Wizard appears. Add a new implement, and select the implement attachment method.

3 **Select Implement**. Using the drop-down box, select the implement you would like to use in this configuration. If there are no implements in the list, press the **New** button.

4 **Select Operation Type**. Select the Rate Logging/Control operation type. Press the blue right-arrow button to continue.

5 **Select Controller**. Select an existing controller from the drop-down menu, or press the **New** button and use the Controller Setup Wizard to create a controller.

6 **Select Device and Seed Command Type**. After pressing the **New** button, the Controller Setup Wizard appears. Use the drop-down menus to select SeedCommand as your device. Use the bottom drop-down menu to select **Hydraulic Seed Control** as the SeedCommand Type. Press the blue right-arrow button to continue.

7 **Enter number of drives**. Use the up and down arrows to enter in the number of hydraulic drives on your planter. Press the blue right-arrow button to continue.

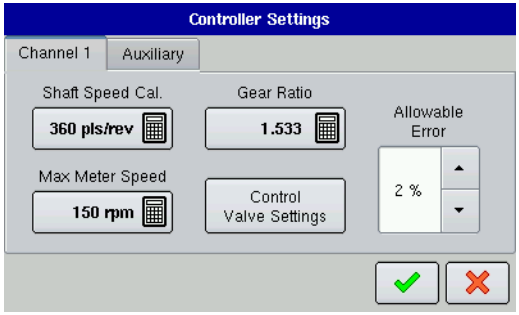
8 **Enter suggested controller name**. A suggested controller name appears. If necessary, use the on-screen keyboard to edit the name of the controller.

9 **Select Ground Speed Source**. Select a Primary and Backup Ground Speed Source, (such as GPS, Wheels, Track or Radar). Press the blue right-arrow button to continue.

10 **Enter Suggested Name for Configuration**. Use the keyboard button to enter a name for the configuration. Press the checkmark box when complete.

Controller Settings for Hydraulic Seed Rate Motor Drives

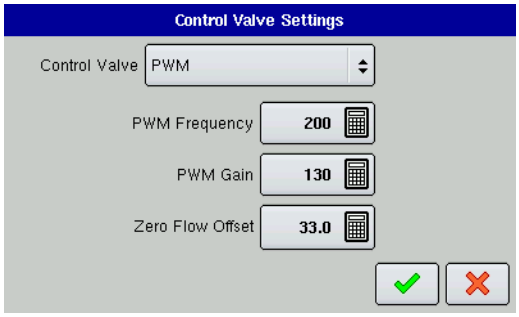
Channel Tabs



- **Shaft Speed Cal** - Calibration number representing the pulses that equal one revolution of the hydraulic motor.
- **Max Meter Speed** - Setting determines the maximum RPM of the seed meter, and is specified by the manufacturer. A warning informs you if this threshold is exceeded.
- **Gear Ratio** - Ratio of the revolutions of the hydraulic drive as compared to the revolutions of the seed meter. For more information, *See "Gear Ratio Calculations for Seed Rate Motors" on page 173.*
- **Allowable Error** - Determines the percent of error that is allowed prior to the product control system making any flow rate changes.
- **Control Valve Settings** - This button summons the Control Valve Settings screen. If your planting configuration uses a PWM valve, *See "Control Valve Settings - PWM" on page 163.*; if your planting configuration uses a Servo valve, *See "Control Valve Settings - Servo" on page 164.*

Controller Settings for Hydraulic Seed Rate Controller Drives (continued)

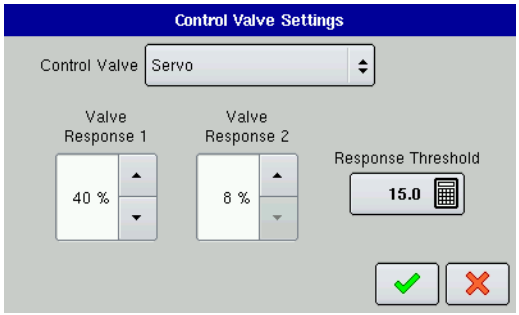
Control Valve Settings - PWM



- **Control Valve** - Setting determines the type of control valve being used for the hydraulic motor. Choices include **PWM** or **Servo**.
- **PWM Frequency** - The frequency that the PWM control valve is pulsed at. Settings can be found from the manufacturer of the valve. Typical settings range from 100-125 Hz.
- **PWM Gain** - Determines how aggressively the control valve responds when making rate change adjustments. The higher the value the more aggressive the system response is.
- **Zero Flow Offset** - Represents the maximum duty cycle that is sent to the control valve without producing any hydraulic flow from the PWM valve. Using too high of a Zero Flow Offset value can cause the product control system to not properly control low rates. See the PWM valve manufacturer's information for recommended settings.

Controller Settings for Hydraulic Seed Rate Controller Drives (continued)

Control Valve Settings - Servo

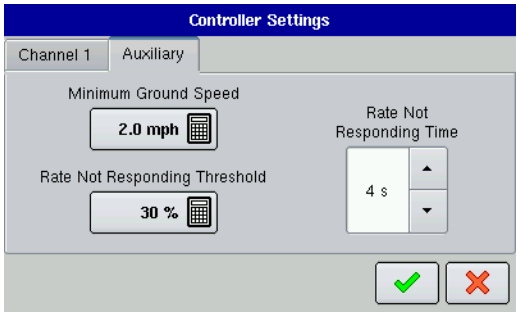


- **Control Valve** - Setting determines the type of control valve being used for the hydraulic motor. Choices include **PWM** or **Servo**.
- **Valve Response 1** - Determines the speed of the servo valve when product control error exceeds the Response Threshold setting.
- **Valve Response 2** - Determines the speed of the servo valve when product control error is less than the Response Threshold setting.
- **Response Threshold** - Determines the system responsiveness to rate change.

Controller Settings for Hydraulic Seed Rate Controller Drives (continued)

Auxiliary Tab

The Auxiliary Tab of the Controller Settings screen adjusts the minimum speed, threshold and rate time of the motion detection sensor that turns the Hydraulic Drive on.



- **Minimum Ground Speed** - The Minimum Ground Speed performs two functions: It determines the speed at which the motion detection sensor disengages and actual ground speed is used for rate control; and also determines the minimum seed meter RPM when the motion detection sensor is active.
- **Rate Not Responding Threshold** - The percentage of seed rate error that triggers the alarms.
- **Rate Not Responding Time** - The amount of time that the error occurs before the alarm sounds.

Hydraulic Seed Controller Settings for Specific Planters

Hydraulic Controller Settings - John Deere Planters	
Control Valve Configuration	**PWM**
PWM Frequency	**175**
PWM Gain	**110**
Zero Flow Offset	**40**
Gear Ratio (chain drive) (ProShaft)	 **2.374** **2.417**
Pulses/Rev	**360**
Hydraulic Controller Settings - White Planters	
Control Valve Configuration	**PWM**
PWM Frequency	**200**
PWM Gain	**90**
Zero Flow Offset	**30**
Gear Ratio	**5.5**
Pulses/Rev	**360**
Hydraulic Controller Settings - Case IH Planters	
Control Valve Configuration	**PWM**
PWM Frequency	**100**
PWM Gain	**95**
Zero Flow Offset	**40**
Gear Ratio	**6.803**
Pulses/Rev	**360**

Hydraulic Seed Meter Calibration Numbers

Prior to calibrating the Hydraulic Seed Meter, the numbers that appear in the Meter Calibration box in the Planter Control window should be similar to the numbers that appear below. If they are not, then your seed meter may be working incorrectly, or you may have set the Gear Ratio incorrectly. In these cases, contact Ag Leader Technical Support for further assistance.

	Note: Check your operator's manual for more specific information on other seed disk options.

Planter brand and type	Corn	Soybeans	Cotton Standard Rate	Sorghum
John Deere				
Vacuum: Standard	**30**	**108**	**64**	**45**
Vacuum: ProMax™	**40**			
Vacuum: Precision Planting eSet®	**30**			
Vacuum: VenHuizen AccuVac Kit	**40**			
Mechanical: Finger	**12**			
Mechanical: Brush Meter		**56**		
Case IH				
Vacuum	**48**	**60**	**80**	**80**
Cyclo®	**36**	**240**		

Hydraulic Seed Meter Calibration Numbers (continued)

Planter brand and type	Corn	Soybeans	Cotton Standard Rate	Sorghum
KINZE				
EdgeVac®	**39**	**60**	**54**	**60**
Mechanical:Finger	**12**	**56**	**48**	**60**
White				
	30	**60**		
Great Plains				
Mechanical Standard	**12**	**110**	**120**	**102**
Mechanical: Twin Row	**6**	**100**		**135**

	Note: If you are encountering a problem with skips in the field or if the hydraulic drive is not shutting off properly, you may need to adjust the Zero Flow Offset settings. For more information, *See "Zero Flow Offset Variation" on page 183.*

Stepper Seed Rate Control

The Stepper Seed Control module allows Rawson ACCU-RATE Variable Rate Controller users to control up to three hydraulic motor drives via the EDGE display. If you have purchased the Stepper Seed Rate Control module, you should configure it in the following order.

1 **Configure Stepper Seed Rate Control module**. See *"Stepper Seed Rate Control Configuration" on page 170*

2 **Enter Controller Settings**, including the Max Meter Speed, Gear Ratio and Minimum Allowable Ground Speed. See *"Controller Settings for Stepper Seed Rate Motor Drives" on page 171* and also *"Gear Ratio Calculations for Seed Rate Motors" on page 173*.

3 **Prime the Stepper Seed Meter**. This fills the seed meter with seed, and thus allows you to avoid skips in your field. See *"Priming Seed Rate Meters" on page 179*.

4

- **a. Enter Meter Calibration Number**. This number, representing seeds per revolution, is set according to the number of seeds dropped per one revolution of the seed meter. See *"Calibrating Seed Rate Meters" on page 180*.
- **b. Perform a Seed Meter Calibration** (not always required). A new calibration should be performed if your as-applied seed rate does not match the actual population planted. See *"Calibrating Seed Rate Meters" on page 180*.

Stepper Seed Rate Control Configuration

Press the Planting button at the Setup Screen and go to the Planting Configuration Tab.

1 **Create or add a vehicle**. Follow the on-screen wizard to set up a vehicle.

2 **Add Implement**. After you have completed the vehicle configuration, the Implement Attachment Wizard appears. Add a new implement, and select the implement attachment method.

3 **Select Implement**. Using the drop-down box, select the implement you would like to use in this configuration. If there are no implements in the list, press the **New** button.

4 **Select Operation Type**. Select the **Rate Logging/Control** operation type. Press the blue right-arrow button to continue.

5 **Select Controller**. Select an existing controller from the drop-down menu, or press the **New** button and use the Controller Setup Wizard to create a controller.

6 **Select Device and Seed Command Type**. After pressing the **New** button, the Controller Setup Wizard appears. Use the drop-down menus to select SeedCommand as your device. Use the bottom drop-down menu to select **Stepper Seed Control** as the SeedCommand Type. Press the blue right-arrow button to continue.

7 **Enter number of drives**. Use the up and down arrows to enter in the number of hydraulic drives on your planter. Press the blue right-arrow button to continue.

8 **Enter suggested controller name**. A suggested controller name appears. If necessary, use the on-screen keyboard to edit the name of the controller.

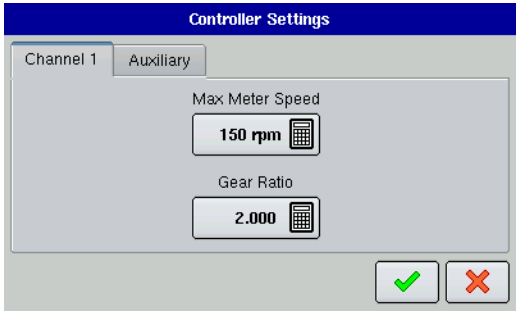
9 **Select Ground Speed Source**. Select a Primary and Backup Ground Speed Source, (such as GPS, Wheels, Track or Radar). Press the blue right-arrow button to continue.

10 **Enter Suggested Name for Configuration**. Use the keyboard button to enter a name for the configuration. Press the checkmark box when complete.

Controller Settings for Stepper Seed Rate Motor Drives

The Controller Settings used by operators of the Stepper Seed Rate Control feature should be set before entering a meter calibration number or performing field operations. To begin, go to the Controller Tab and press the Wrench Button When the Controller Configuration Screen opens, press the **Controller Settings** button. The Controller Settings Screen appears, as shown below. Each channel is displayed with its own tab, and the Auxiliary Tab is where you adjust the Minimum Allowable Ground Speed.

Channel Tabs

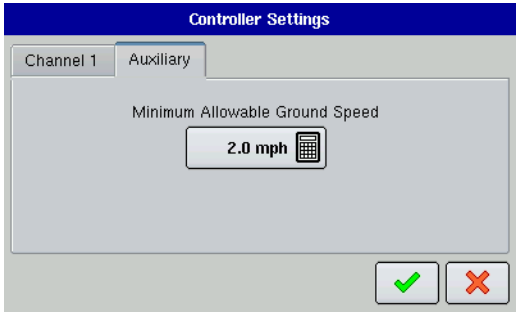


- **Max Meter Speed** - This number represents the maximum recommended RPM of the seed meter, and is specified by the manufacturer. A warning informs you if this threshold is exceeded.
- **Gear Ratio** - The ratio of the revolutions of the hydraulic drive to turn the seed meter one revolution.

	Note: For more information regarding how to calculate the Gear Ratio, see "Gear Ratio Calculations for Seed Rate Motors" on page 173, as well as "Gear Ratio Drawing for Multiple Drive Combinations" on page 175 and "Gear Ratio Drawing for John Deere ProShaft™ Drives" on page 177.

Controller Settings for Stepper Seed Rate Motor Drives (continued)

Auxiliary Tab



- **Minimum Allowable Ground Speed** - The EDGE display will simulate this specified ground speed when you press the Jump Start switch. This fixed ground speed setting compensates for delays in acquiring an initial ground speed when starting from a standstill.

Gear Ratio Calculations for Seed Rate Motors

The Gear Ratio is a setting that appears on the Channel Tab of the Controller Settings Screen for users of the Hydraulic Seed Rate Controllers and Stepper Seed Meter Motor Drive. It is the ratio of the revolutions of the hydraulic or stepper seed rate drive as compared to one revolution of the seed meter. This setting is used to determine how fast the Hydraulic Drive Motor or Stepper Seed Rate Motor should operate to achieve the proper RPM of the seed meter during planting operations.

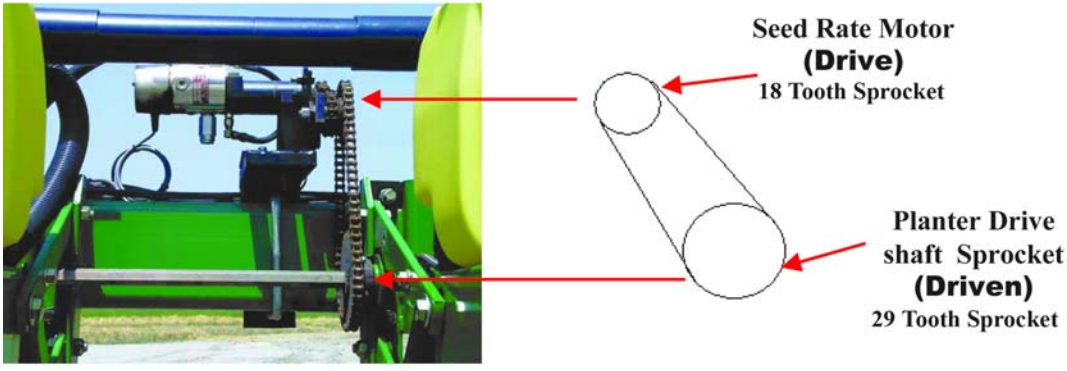
SeedCommand users (such as those using the Hydraulic Seed Rate or Stepper Seed Rate Controller) who are required to manually enter in a Gear Ratio in the Controller Settings screen should calculate this Gear Ratio based on information provided below and on the following pages. The Gear Ratio number is calculated by multiplying all the gear ratio combinations, from the Seed Rate Drive Motor to the Seed Meter.

	Note that this Gear Ratio number is the number of revolutions of the motor to turn the seed meter one revolution.

Gear Ratio Drawing for Single Motor Drive

Seed Rate Drive Setting

(Calculating drive gear ratio)



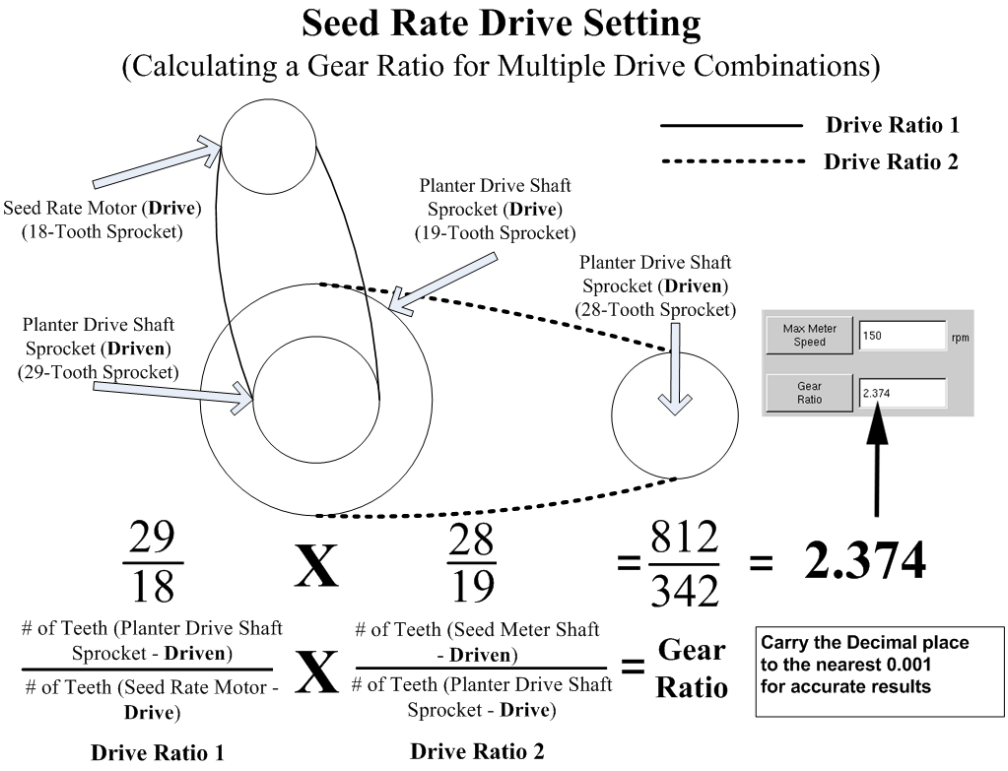
$$\frac{\text{\# Of Teeth on the (Driven) Sprocket}}{\text{\# Of Teeth on the (Drive) Sprocket}} = \text{Gear Ratio}$$

*** Each drive combination (Drive/Driven) from Seed Rate Motor Drive to Seed Meter shaft sprocket needs to be factored for the Total Gear Ratio.**

$$\frac{\text{\# Of Teeth (Driven)}}{\text{\# Of Teeth (Drive)}} \times \frac{\text{\# Of Teeth (Driven)}}{\text{\# Of Teeth (Drive)}} \times \frac{\text{\# Of Teeth (Driven)}}{\text{\# Of Teeth (Drive)}} = \text{Gear Ratio}$$

Drive/Driven 1 X Drive/Driven 2 X Drive/Driven .....= Gear Ratio

Gear Ratio Drawing for Multiple Drive Combinations


Seed Rate Drive Setting
(Calculating a Gear Ratio for Multiple Drive Combinations)
Drive Ratio 1
Drive Ratio 2
Seed Rate Motor (Drive) (18-Tooth Sprocket)
Planter Drive Shaft Sprocket (Drive) (19-Tooth Sprocket)
Planter Drive Shaft Sprocket (Driven) (28-Tooth Sprocket)
Planter Drive Shaft Sprocket (Driven) (29-Tooth Sprocket)
Max Meter Speed
150
rpm
Gear Ratio
2.374
29/18 X 28/19 = 812/342 = 2.374
# of Teeth (Planter Drive Shaft Sprocket - Driven) / # of Teeth (Seed Rate Motor - Drive)
X
# of Teeth (Seed Meter Shaft - Driven) / # of Teeth (Planter Drive Shaft Sprocket - Drive)
= Gear Ratio
Carry the Decimal place to the nearest 0.001 for accurate results
Drive Ratio 1
Drive Ratio 2

Seed Ratio Calculation Example Procedure: Multiple Drives

The example outlined below assumes that you have a single planter drive motor. Step 5 notes that this process has multiple steps if you have more than one Stepper Seed Motor Drives.

Step 1: Beginning with the Seed Rate Motor, count the number of teeth on the drive sprocket. Then count the number of teeth on the driven sprocket.

Step 2: Divide the number of teeth on the driven sprocket by the number of teeth on the drive sprocket. This is the ratio of the Seed Rate motor.

Step 3: Repeat the process for each sprocket combination in the drive system back to the meter.

Step 4: Take the ratio of the Seed Rate Motor and multiply it by the ratio of the other sprocket combinations.

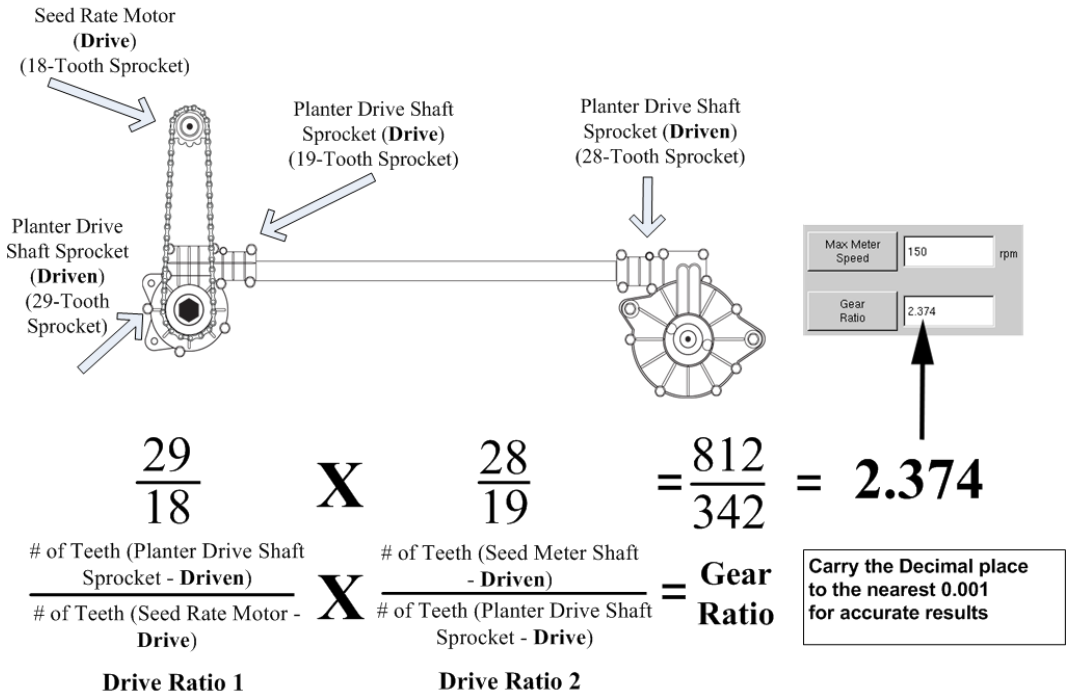
Step 5: Repeat this process if you have multiple hydraulic drives. Enter the gear ratio for each motor under the appropriate tab on the InSight display.

	Note: If you have additional motor drives on the planter and these motor drives have the same total gear ratio, enter that number into the other channels.

Gear Ratio Drawing for John Deere ProShaft™ Drives

Seed Rate Drive Setting

(Calculating a Gear Ratio for John Deere Pro-Shaft™ Drives)



$$\frac{29}{18} \times \frac{28}{19} = \frac{812}{342} = 2.374$$

$$\frac{\text{\# of Teeth (Planter Drive Shaft Sprocket - Driven)}}{\text{\# of Teeth (Seed Rate Motor - Drive)}} \times \frac{\text{\# of Teeth (Seed Meter Shaft - Driven)}}{\text{\# of Teeth (Planter Drive Shaft Sprocket - Drive)}} = \text{Gear Ratio}$$

Drive Ratio 1 **Drive Ratio 2**

Carry the Decimal place to the nearest 0.001 for accurate results

Seed Ratio Calculation Example Procedure for Pro-Shaft™ Drives

The example outlined below assumes that you have a single planter drive motor. Step 5 notes that this process has multiple steps if you have more than one Stepper Seed Motor Drives.

Step 1: Beginning with the Seed Rate Motor, count the number of teeth on the drive sprocket. Then count the number of teeth on the driven sprocket.

Step 2: Divide the number of teeth on the driven sprocket by the number of teeth on the drive sprocket. This is the ratio of the Seed Rate motor.

Step 3: Repeat the process for each sprocket combination in the drive system back to the meter. On the Pro-Shaft Drive, the number of teeth on the driven sprocket is always 28, and the number of teeth on the drive sprocket is always 19.

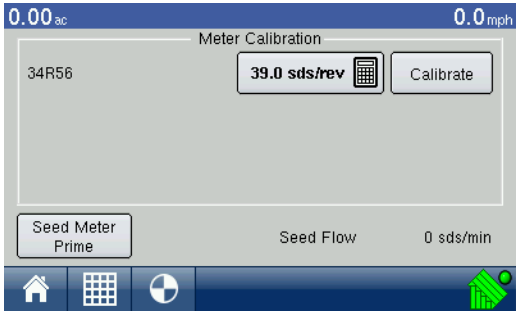
Step 4: Take the ratio of the Seed Rate Motor and multiply it by the ratio of the other sprocket combinations.

Step 5: Repeat this process if you have multiple hydraulic drives. Enter the gear ratio for each motor under the appropriate tab on the InSight display.

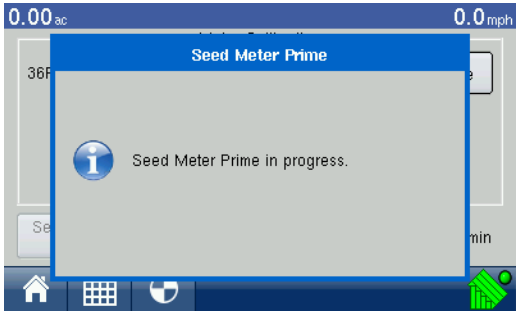
	Note: If you have additional motor drives on the planter and these motor drives have the same total gear ratio, enter that number into the other channels.

Priming Seed Rate Meters

The Seed Meter Prime is used to charge the seed meter when filling with seed. To begin, go to Rate Screen and press the Meter RPM button, as shown at left. The Seed Rate Planter Control Screen appears, as shown below.



1 Press **Seed Meter Prime**. Press the **Seed Meter Prime** button.



2 **Seed Meter Prime in Progress**. A message displays, stating “Seed Meter Prime in Progress.” While this message displays, the seed meter will turn one (and only one) revolution automatically. When complete, you will return to the Seed Rate Planter Control screen.

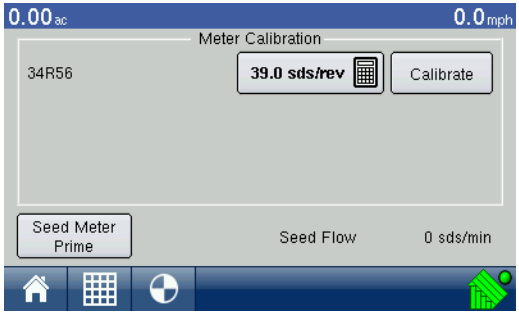
Calibrating Seed Rate Meters

The Meter Calibration number allows the seed meter to communicate the correct seed population to the EDGE display. Assuming the Controller Settings are correct for the seed rate, this Meter Calibration number, which is based on the number of cells on the seed meter, should not need to be adjusted. However, you may wish to recalibrate before changing seed types and treatments. You should also recalibrate if the as-applied seed rate does not match the population shown on the planter monitor.

Notes:

- The stepper seed rate meter calibration does not recalibrate any previously-logged planting data.
- This recalibration number applies to a specific crop type, i.e., corn. Normally, you should not need to recalibrate when switching varieties within the same crop type.
- Before beginning a calibration, make sure that you have primed the seed meter. For more information, *See "Priming Seed Rate Meters" on page 179.*

1 To begin, go to the Rate Screen and press the Meter RPM button, as shown at left. The Seed Rate Planter Control Screen appears, as shown below.

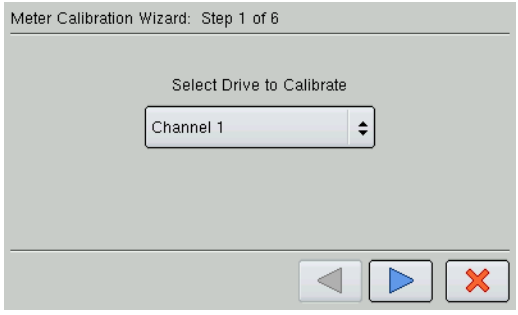


Calibrating Seed Rate Meters (continued)

2 **Acknowledge the Warning**. Acknowledge this warning by pressing the checkmark box.

Meter Calibration Wizard: Step 1 of 6
Warning
Maintain a safe distance from the planter during the calibration routine. The planter should be lowered near the ground with the seed meter fully charged with seed and all necessary fans and/or auxiliary metering devices on.

3 Press the **Calibrate** button and the Meter Calibration Wizard appears, as shown below.



4 **Select Drive to Calibrat**e. Select the drive that you wish to calibrate. Press the blue right-arrow button to continue.

5 **Enter Simulated Ground Speed**. Enter the simulated ground speed for the calibration procedure. Press the blue right-arrow button to continue.

6 **Enter Simulated Target Rate**. Enter the simulated target rate of the calibration procedure. Press the blue right-arrow button to continue.

Calibrating Seed Rate Meters (continued)

7 **Press Start**. Press the green-colored **Start** button to begin dispensing the seed.

8 **Dispensing Seed**. The seed meter turns for five revolutions. As the seed meter dispenses seed, the button will change its color to red, and a message informs you that the seed dispensation is in process.

9 **Seed Dispensing Complete**. When the meter is finished dispensing seed, the button will change back to its original green color, and will once again display the word Start. Press the blue right-arrow button to continue.

10 **Enter Number of Dispensed Seeds**. Use the numeric keypad to enter the number of dispensed seeds that you counted in Step 9. Press the blue right-arrow button to continue.

	Note: The meter calibration will be calculated from the actual seed amount dispensed.

Troubleshooting

Zero Flow Offset Variation

Zero flow offset is an operator-entered setting. Zero Flow Offset represents the maximum duty cycle that is sent to the control valve without producing any hydraulic flow from the PWM valve. Using too high of a Zero Flow Offset value can cause the product control system to not properly control low rates. Zero flow offset may vary somewhat by system and by operating conditions.

On the tables on the following pages, problems and causes relating to Zero Flow Offset are listed. Use the Confirmation Techniques to determine if you have this problem; and then follow the appropriate solution.

Zero Flow Offset Variation (continued)

<table>
<tr><th>Problem</th><th>Possible Cause</th><th>Confirmation Technique</th></tr>
<tr><td rowspan="2">Drive is slow to begin turning.</td><td rowspan="2">Zero Flow Offset is set too low.</td><td>1. Turn the Master Switch off. Enter a manual ground speed and enter a new region.
2. From the Run screen, open the product application rate window, and highlight the appropriate product. Select Manual control mode.
3. Switch the Master Switch on.
4. Press the up button one time. Now press the down button one time. If the drive is not turning, the Zero Flow Offset is likely to be too low.</td></tr>
<tr><td>Solution
1. Turn the Master Switch off. Enter a manual ground speed and create a new region.
2. Increase Zero Flow Offset by 2.
3. From the Run screen, open the product application rate window, and highlight the appropriate product. Select Manual control mode.
4. Switch the Master Switch on.
5. Press the up button one time. Now press the down button one time. The drive should be turning. If not, repeat this procedure starting with Step 2.

Note: Zero Flow Offset should never be greater than 60. If 60 is insufficient, there must be some other problem causing the skips. Contact Ag Leader Technical Support for further assistance.</td></tr>
</table>

Zero Flow Offset Variation (continued)

<table>
<tr><th>Problem</th><th>Possible Cause</th><th>Confirmation Technique</th></tr>
<tr><td rowspan="3">Hydraulic drive not shutting off properly, or minimum controllable speed is greater than specified.</td><td rowspan="3">Zero Flow Offset is set too high.</td><td>1. Turn the Master Switch off. Enter a manual ground speed and create a new region.
2. From the Run screen, open the product application rate window, and highlight the appropriate product. Select Manual control mode.
3. Switch the Master Switch on.
4. Press the up button one time. Now press the down button three times. If the drive is still turning, the zero flow offset is likely to be too high.</td></tr>
<tr><th>Solution</th></tr>
<tr><td>1. Turn the Master Switch off. Enter a manual ground speed and enter a new region.
2. Reduce Zero Flow Offset by 2.
3. From the Run screen, open the product application rate window, and highlight the appropriate product. Select Manual control mode.
4. Switch the Master Switch on.
5. Press the up button one time. Now press the down button three times. The drive should not be turning. If it is, repeat this procedure, starting with step 2.

Note: Zero Flow Offset should never be less than 25. If 25 still seems as if this number is too high, there must be some other problem. Contact Ag Leader Technical Support for further assistance.</td></tr>
</table>

Stepper Seed Control Meter Alarms

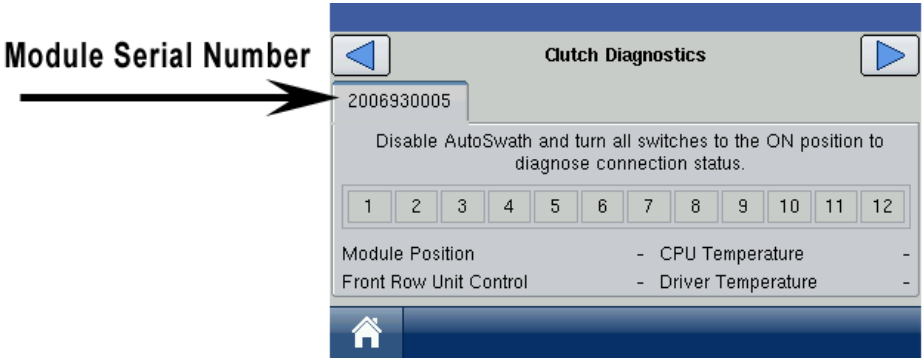
Startup Error Message	Possible Cause	Solution
Drive Out of Synch Error Drive #"	Not enough hydraulic fluid is flowing to the seed meter.	Examine the stepper seed drive's hydraulic components for restrictions. - Make sure the tractor's hydraulic outlet is turned on. - Make sure the hydraulic flow settings are correct.
"Drive Stalled Drive #"	The hydraulic drive motor has stopped rotating.	Check the stepper seed motor to see if it is restricted from turning, and that the hydraulic drive is working.
"Meter Not Moving - Drive #"	Either the Seed Meter Calibration failed, or the Seed Meter Prime failed.	Make sure that the tractor's hydraulic outlet is turned on.
"Seed Drive at Maximum RPM Drive #"	If you start the priming routine and the hydraulic motor is not on.	- Slow the planter unit's ground speed. - Reduce the Planting Target Rate.

Diagnostics

Specific diagnostics information which pertain to planting functions can be viewed when you press the Diagnostics button on the Home Screen. For planting operations, this diagnostic information includes Clutch Diagnostics and Input Diagnostics. Technical support may request that you look at this screen to help in diagnosing a problem. For generalized diagnostic information, such as memory, display, CAN device and firmware version information, *See "Diagnostics" on page 45.*

Clutch Diagnostics (for Row Shutoff)

The Clutch Diagnostics Tab shows the voltage flowing from each of the 12 pins in the Row Shutoff module.


Module Serial Number
Clutch Diagnostics
2006930005
Disable AutoSwath and turn all switches to the ON position to diagnose connection status.
1 2 3 4 5 6 7 8 9 10 11 12
Module Position -
Front Row Unit Control -
CPU Temperature -
Driver Temperature -

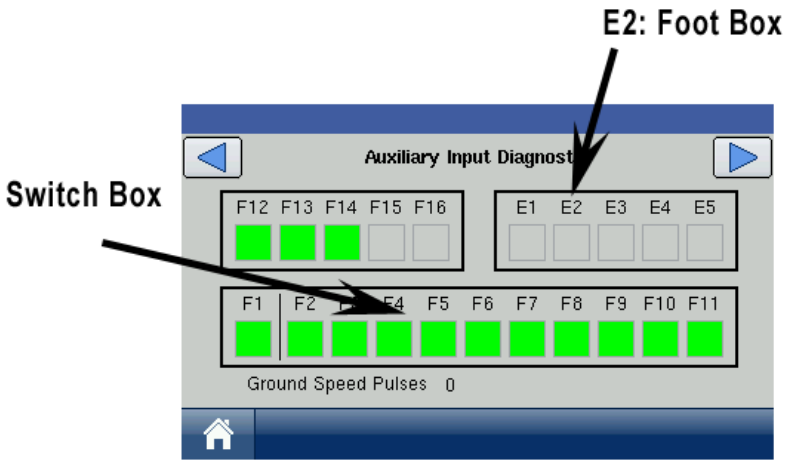
Diagnostics (continued)

Input Diagnostics

The Input Diagnostic Tab lists the number of Ground Speed Pulses coming in from the radar to the Auxiliary Module.

Additionally, the bottom row of boxes lists the active switches on the switch box. These color coded boxes display the following diagnostics:

- Green: The switch box is connected to the Auxiliary Module in the On position.
- Black: The switch box is connected to the Auxiliary Module, but is in the Off position.
- Grey: The switch box is not connected to the Auxiliary Module.


E2: Foot Box
Switch Box
Auxiliary Input Diagnost
F12 F13 F14 F15 F16
E1 E2 E3 E4 E5
F1 F2 F4 F5 F6 F7 F8 F9 F10 F11
Ground Speed Pulses 0

	Note: The E2 position is the indicator for the foot box.

	Note: Other diagnostic settings can be found in "Diagnostics" on page 45

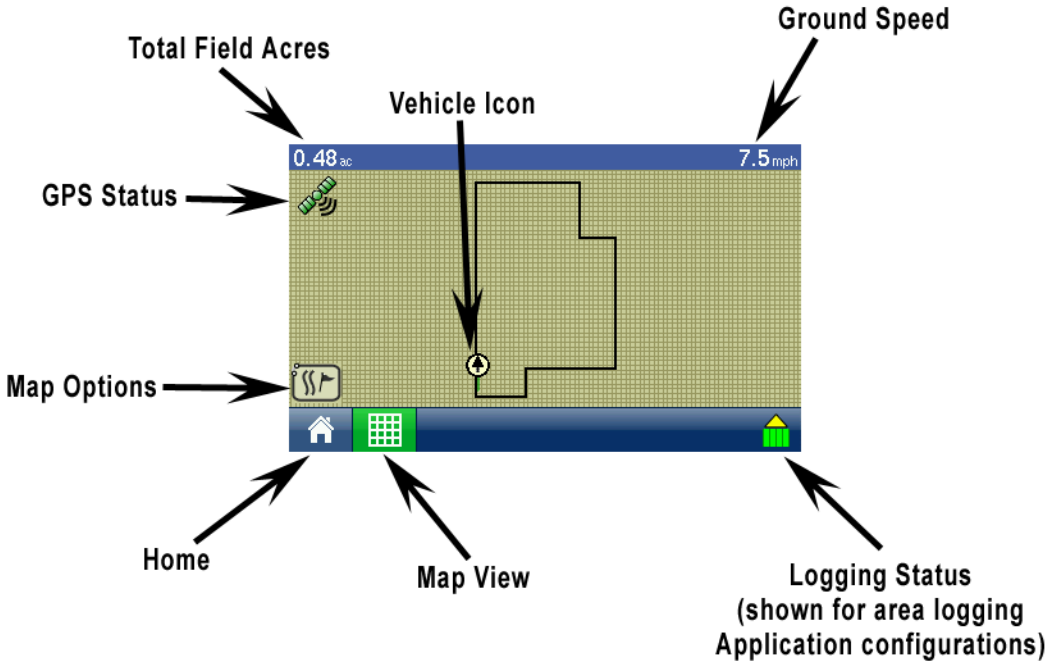
Application

Run Time Environment: Map Screen

The screens shown in this section are for an Application configuration. In order for you to view the Map Screen, you must first select a Grower, Farm and Field at the Start Field Operation portion of the Home Screen. For more information, *See "Management" on page 16.* Once a configuration has been completed, the Map View button appears at the bottom of the Home Screen.

Map Screen - Zoom to Extent

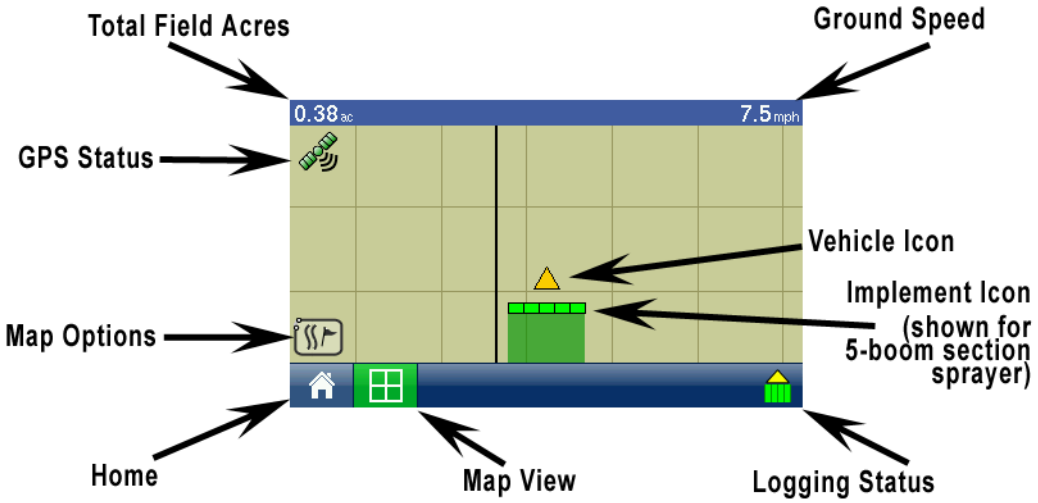
Press the Map View button, and the Map Screen appears, as shown below. Below is an Area Logging configuration, displayed in Zoom to Extent view.



	Note: Pressing the Map View button will cycle between the available map screen views, and the appearance of the Map View button changes.

Map Screen: Zoom Detail

When the Map Screen is shown in Zoom Detail, the Vehicle Icon appears as a gold triangle, rather than an arrow. The map below is shown for a typical Application Configuration which does not include any Rate Control features. This sprayer includes five boom sections, and these sections are shown as individual boxes on the Implement Icon behind the Vehicle Icon.



	Note: For information on Map Screen items that are standard for all EDGE operations, *See "Run Time Environment: Map Screen" on page 30.*

Application Map Screen Items

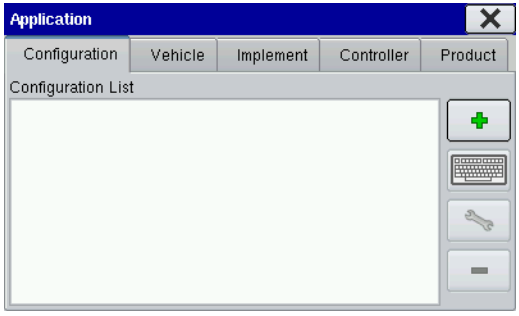
The following Application Map Screen Items are available at the Map Screen:

- **Legend** - During Application operations, the Map Screen displays two types of items in the Legend: **Rate**, and Prescription (**Rx**). The Legend is only accessible in the Zoom to Extent view. For more information about the Display Legend, *See "Edit Legend" on page 34.*
- **Display Legend icon**- The Display Legend icon makes the Legend appear. When the Legend appears, the arrow points down; when it is turned off the arrow points up. As with the Legend, the Display Legend icon is only accessible in the Zoom to Extent view.
- **Vehicle and Implement Icon** - The vehicle icon shows the vehicle, while the Implement Icon shows the number of sections on the implement, as well as the implement's logging status. This item only appears in the Zoom Detail view.
- **Logging Status Button** - This button shows for Application Operations that are configured for Area Count.

	Note: For an explanation of display items not listed above, *See "Map Screen Icons" on page 32.*

Application Setup Tabs

Pressing the Application button at the Setup Screen takes you to the Application Setup **Configuration** Tab. This Tab is shown in front of four other tabs: **Vehicle**, **Implement**, **Controller** and **Product**.

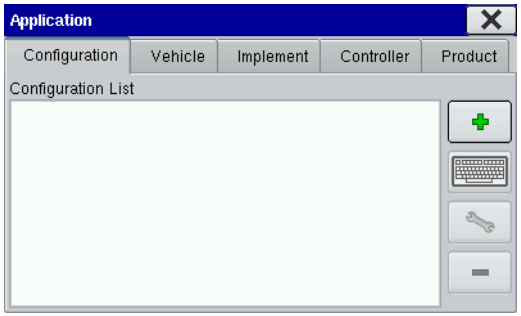


- **Configuration Tab** - The **Configuration** Tab is where you can add and edit operating configurations. For more information, *See "Create an Application Configuration" on page 194.*and also *See "Configuration Settings" on page 196.*
- **Vehicle Tab** - The **Vehicle** Tab is where you can add and edit vehicles. For more information, *See "Vehicle Tab" on page 208.*
- **Implement Tab** - The **Implement** Tab is where you can add and edit implements. For more information, *See "Implement Tab" on page 212.*
- **Controller Tab** - The **Controller** Tab is where you can add and edit controllers for use during application. For more information, *See "Controller Tab" on page 214.*
- **Product Tab** - The **Product** Tab is where you can and edit crop nutrient and protection products. This tab contains a list of pre-defined products and allows configuration of tank mixes and fertilizer blends. For more information, *See "Product Tab" on page 216.*

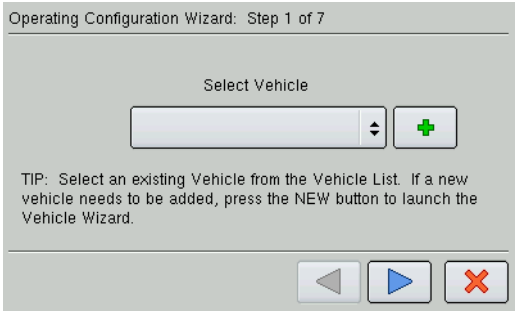
Create an Application Configuration

To set up an Application configuration, you must set up Vehicle, Implement, Controller and Products with the procedure described on this page.

1 At the Setup screen, press the Application button. The Configuration Tab opens, as shown below.



2 **Press the Add button**. The Operating Configuration Wizard appears, as shown below. From here, follow the Wizard's instructions to create a configuration that includes Vehicle, Implement, and Controller settings.


Operating Configuration Wizard: Step 1 of 7
Select Vehicle
TIP: Select an existing Vehicle from the Vehicle List. If a new vehicle needs to be added, press the NEW button to launch the Vehicle Wizard.

	Note: From the Configuration Tab, you can also: • *Press the on-screen keyboard to edit or rename existing configurations.* • *Press the Wrench button to access Configuration Settings. For more information* *See "Configuration Settings" on page 196.* • *Press the Remove button to remove a configuration. Caution: When deleting a configuration all data logged with that configuration will be deleted.*

Create an Application Configuration (continued)

3 Select Implement. Select the desired implement from the drop down list; then press the blue right-arrow button and proceed to step 4. If your implement is not listed, press New. Select an Implement Attachment Method, Enter a Full Swath Width, Enter the Number of Boom Sections, Enter Boom Section Widths from Left to Right, Enter Distance from Hitch to Application Point, and Enter an Implement Name. Press the blue right-arrow button to continue.

4 **Select Operating Mode.** Use the drop-down menu to select **Rate Logging/Control** if you are going to be creating a configuration where an application rate is logged (such as a DirectCommand configuration). Otherwise, select **Area Logging Only** if you are creating a Site Verification configuration. Press the blue right-arrow button to continue.

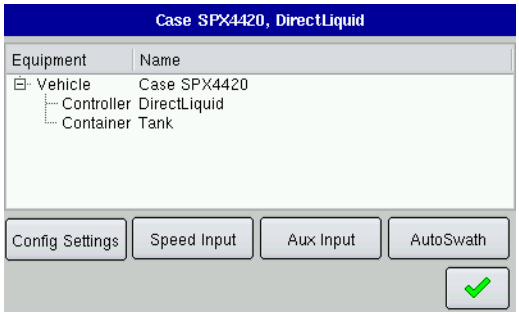
- If you selected **Rate Logging Control**, continue at Step 5 below.
- If you selected **Area Logging Only**, select an Implement, and a Ground Speed Source; and then name and save the configuration.

5 **Select Controller.** Select the **Device** and **Direct Type** of your configuration. Under **Device**, select either **DirectCommand**, **Serial Controller**, or **Flow Meter**.

- If you selected **DirectCommand** as the Device, under **Direct Type** choose either:
  - **Liquid Product Control.** From here, enter a Flow Meter Calibration number, and then name and save the configuration. For a more detailed DirectCommand Liquid Product configuration procedure, *See "Liquid Application Control Configuration" on page 261.*
  - **Spinner Spreader Control 3CH** or **Spinner Spreader Control 5 CH**. From here, name and save the configuration. For a more detailed DirectCommand Spinner Spreader configuration procedure, *See "Spinner Spreader Control Configuration" on page 282.*
- If you entered **Serial Controller** as the Device, select the **Make** and **Model** of your application device, then name and save the configuration.
- If you entered **Flow Meter** as the Device, use the numeric keypad to enter the Flow Meter Calibration Number, then name and save the configuration.

Configuration Settings

By highlighting a configuration and pressing the Wrench button on the Configuration Tab, you can summon the Configuration Settings screen, where you can edit Configuration Settings, Speed Input Settings, Auxiliary Input Settings and AutoSwath Settings.



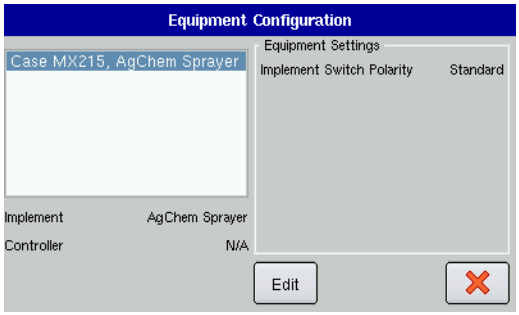
- **Configuration Settings** - Press to display and edit application settings specific to a vehicle, implement and controller combination. For more information, *See "Configuration Settings: Equipment Configuration" on page 197.*
- **Speed Input** - Press to select speed input device. For more information, *See "Speed Input Settings" on page 200.*
- **Aux Input** - Press to display and edit Auxiliary Input settings. For more information, *See "Auxiliary Input Settings" on page 201.*
- **AutoSwath** - Press to display and edit automatic swath control settings. For more information, *See "AutoSwath" on page 206.*

	Note: You must have an unlock code to activate the AutoSwath feature. If you have been using AutoSwath with the DirectCommand™ system, the feature is already activated and ready to use. If you have not unlocked the AutoSwath feature yet, the code can be purchased through your local Ag Leader dealer

Configuration Settings: Equipment Configuration

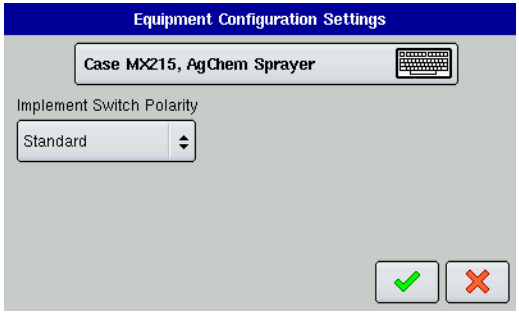
The Equipment Configuration screen is shown below. This screen displays the Implement and Controller information. To edit equipment configuration settings, highlight a configuration and press **Edit**.

Configuration Settings - Area Logging



Edit Configuration Settings - Area Logging

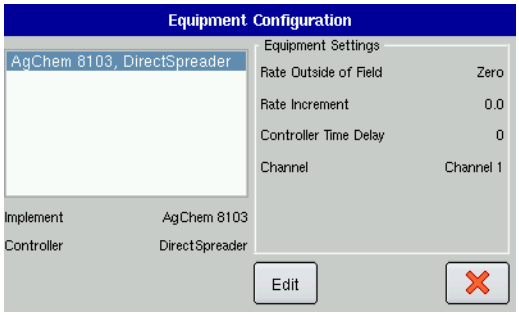
The Equipment Configuration Settings screen, as shown below, is where you can edit the Equipment Configuration name. The appearance of this screen may vary, depending upon your particular application configuration. The picture below illustrates this screen for an area logging application operation.



Edit Configuration Settings Screen - Area Logging

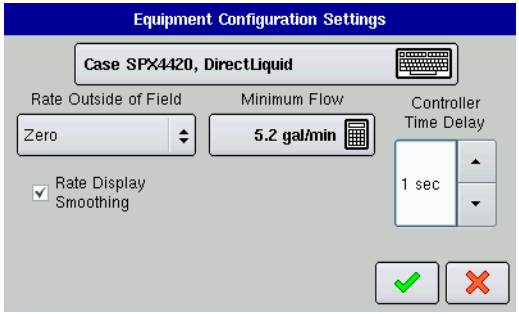
Configuration Settings - DirectCommand

The Equipment Configuration screen is shown below. This screen displays the Implement and Controller information. To edit equipment configuration settings, highlight a configuration and press **Edit**.



Equipment Configuration Screen - DirectCommand

Configuration Settings - DirectCommand



Equipment Configuration Settings Screen - DirectCommand

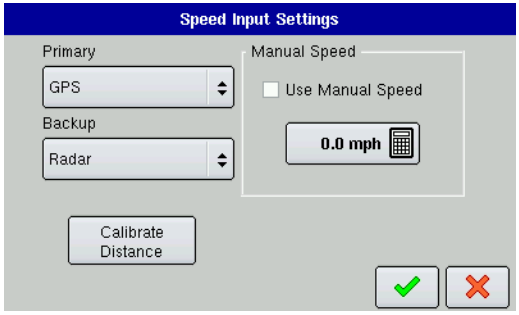
- **Configuration Name** - The configuration name can be changed by pressing the on-screen keyboard.
- The **Rate Outside of Field** selection determines product control channel behavior when the field boundary is exited.
  - **Zero** = Product application will turn off.
  - **Last Good** = Product application will continue at the last value used by the control system.
  - **Rx Default** = Product will be applied at the default rate setting
- The **Minimum Flow** setting is used to maintain a consistent spray pattern. The display will not allow flow to drop below the entered setting. Set to flow at the lowest operating pressure for the selected spray tips with all sections on. When spraying with one or more boom sections off, the system automatically reduces the minimum flow setting according to the reduced spray width. To adjust this setting, select the keyboard button and enter the desired numeric value.
- The **Controller Time Delay** setting compensates for any latency in the control system when changing between different product flow rates during variable rate application. The typical setting range for this is 0-8 seconds.

Speed Input Settings

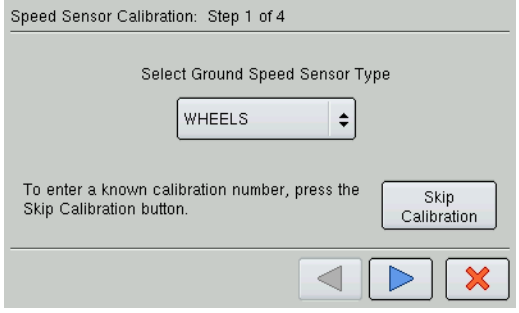
The Speed Input Settings screen is where you can calibrate the ground speed input for accurate speed and area calculations. If you are not using GPS for ground speed, then after you have created a configuration you must calibrate the ground speed input. If you are using GPS, it is recommended to calibrate distance in the event of GPS loss.

Calibrate Distance

1 **Open Configuration Information screen.** On the Configuration Tab, press the configuration name to highlight it, then press the Wrench Button, and the Configuration Settings screen appears. Press Speed Input, and the Speed Input screen appears as shown below.



2 Press the **Calibrate Distance** button, and the Speed Sensor Calibration wizard appears, as shown below.

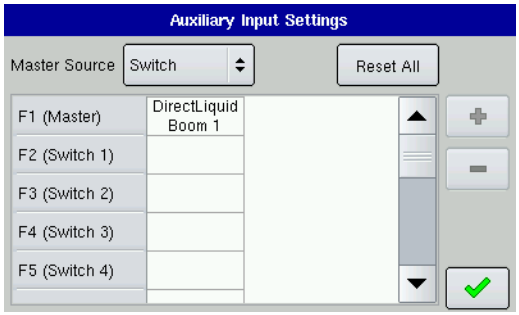

Speed Sensor Calibration: Step 1 of 4
Select Ground Speed Sensor Type
WHEELS
To enter a known calibration number, press the Skip Calibration button.
Skip Calibration

3 From here, follow the on-screen wizard's instructions to complete the distance calibration procedure.

Auxiliary Input Settings

To view Auxiliary Input Settings, go to the Application Setup Configuration Tab and press the Wrench button. At the Configuration Settings screen, press the **Aux Input** button, and the Auxiliary Input Settings screen appears, as shown below.

This Switch Mapping function is active only for users with DirectCommand or SeedCommand features. The Auxiliary Input Settings screen displays settings for the Master Switch and other switch inputs.



The Master Switch drop down menu controls the master switch for your entire configuration. You may see the following options underneath this menu:

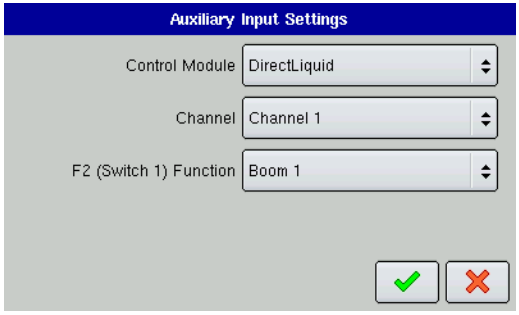
- **Switch** - Controls the master switch.
- **External 2** - This setting can control an optional, floor-mounted master switch.
- **External 1, 3** & **4** - Not used at this time.

The F1-F11 cells can be assigned to any implement sections. You can use these to choose the switches that control a particular section. From here, you can also make the following changes to the switch settings.

- Add a switch setting. For more information, *See "Add Auxiliary Input Settings" on page 202.*
- Remove a switch setting.
- **Reset All** switch settings. This resets the settings to defaults.

Add Auxiliary Input Settings

If you wish to add a switch setting, press the Add button on the Auxiliary Input Settings Screen, and a second Auxiliary Input Settings screen appears, as shown below. This screen shows the following drop down menus specified for switch mapping on a sprayer.

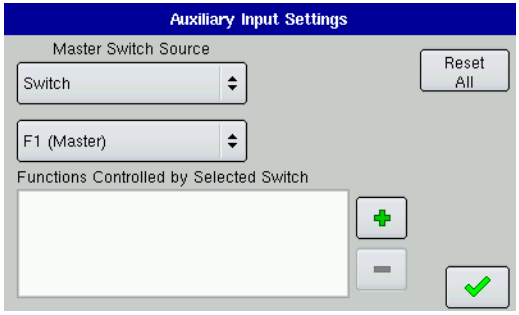


- **Control Module** - Specifies the function of your DirectCommand controller.
- **Channel** - Select the channel to control.
- **F2 Switch 1** - Selects the boom section to turn on and off.

Fence Row Nozzle Indicators

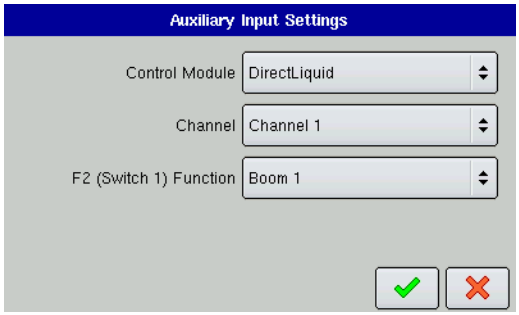
You can control fence row nozzles through a DirectCommand switch box by mapping the switches in Auxiliary Input Settings. The fence row nozzles can be mapped to any switch. Use the following procedure to add fence row nozzles to Auxiliary Input Settings. To begin, go to the Configuration Tab. Highlight your configuration in the Configuration List, then press the Wrench button.

4 **Open Auxiliary Input Settings screen.** At the Configuration Settings screen, press the **Aux Input** button, and the Auxiliary Input Settings screen appears, as shown below.



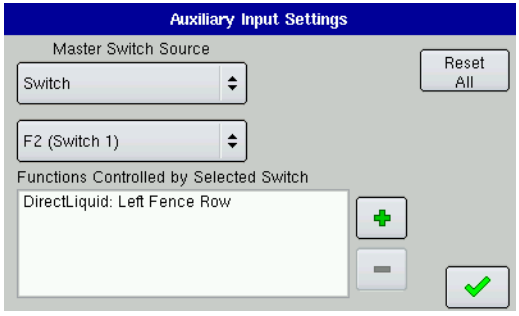
Fence Row Nozzle Indicators (continued)

5 **Remove and Add Switch Settings.** Use the bottom drop-down menu to select the switch you wish to adjust, then press the Add button. A second Auxiliary Input Settings screen appears, as shown below. Use the Function drop-down menu, located at the bottom of this screen, to select the correct Boom or Fence Row Nozzle to be controlled by that switch. Press the checkmark box when finished.



6 **Continue Switch Setting adjustments.** Repeat this process for each switch setting.

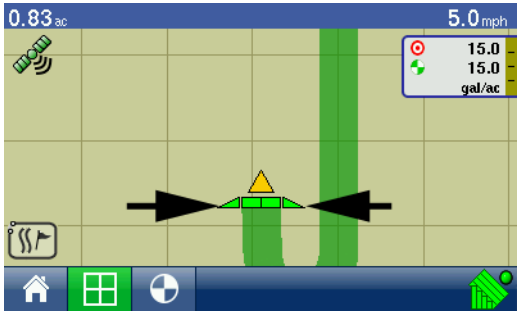
7 **Save Switch Functions.** The new switch settings appear in the lower left-hand portion of the Auxiliary Input Settings screen, as shown below. Press the checkmark box to save these settings.



Fence Row Nozzle Indicators (continued)

8 Fence row nozzle indicators on Map Screen.

After completing these Auxiliary Input Settings changes, the Fence Row Nozzle Indicators, which are shaped like triangles, appear on either side of the sections behind the vehicle icon, as shown below.



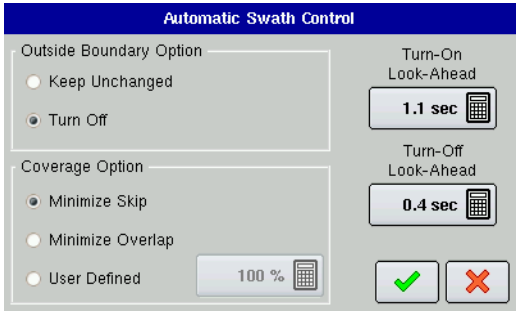
AutoSwath

The Automatic Swath Control feature turns boom sections off and on automatically based upon the following conditions:

- Entering and exiting internal and outer field boundaries.
- Entering and exiting previously-applied areas within a field.

To access the Automatic Swath Control settings, go to the Configuration Tab, highlight a configuration and press the Wrench button. Once the Configuration Settings Screen appears, press the **AutoSwath** button. The Automatic Swath Control screen appears, as shown below. This screen displays Automatic Swath Control settings that are specific to that operation.

	Note: The Automatic Swath Control functionality is an optional feature of both the DirectCommand and SeedCommand Systems. An unlock code must be purchased and installed to enable this feature. Call your local Ag Leader dealer for details and pricing.



Turn-On Look- Ahead - This setting determines how far ahead the system looks to turn the boom sections on. This setting compensates for delay in the product control system when the implement sections are turned on.

AutoSwath (continued)

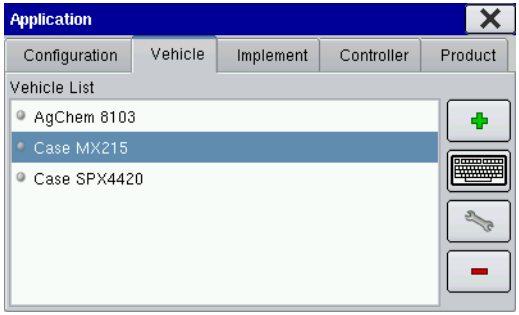
- **Turn-Off Look-Ahead** - This setting determines how far ahead the system looks to turn the sections off. This setting compensates for delay in the product control system when the sections are turned off.
- **Outside Boundary Option** - Select one of the two options to determine system behavior when a section exits a field boundary or prescription mapped area.
- **Coverage Option** - In the Coverage Option area, you must choose between three options:
  - The **Minimize Skip** option turns off the implement section after the entire boom section is fully inside your coverage area. This prevents the possibility of skips.
  - The **Minimize Overlap** option turns off the implement section when that boom section first enters your coverage area. This prevents the possibility of overlaps.
  - The **User Defined** option allows you to choose what percentage of the implement section is within the coverage area before that boom section turns off. For example, if you choose 50%, then the boom section will switch off when half of it is within your coverage area.

AutoSwath Notes

- It is strongly recommended to use a 4 Hz or higher GPS output rate. AutoSwath control will not work until the master and boom section switches are on. A less than 4 Hz GPS output rate can result in your boom sections turning on and off too slow, even at speeds below 10 mph. If you have less than a 4 Hz GPS output rate and your speed goes above 10 mph, a warning appears, advising you to use a 4 Hz GPS rate.
- If using AutoSwath on an implement that is raised out of the ground when not applying, it is recommended to install an implement switch on the toolbar. This will prevent the system from turning on product flow when the implement is out of the ground and the vehicle encounters unapplied area.

Vehicle Tab

The Vehicle Tab provides functionality for setting up and configuring vehicles. The vehicle list will show any vehicles that have already been created.



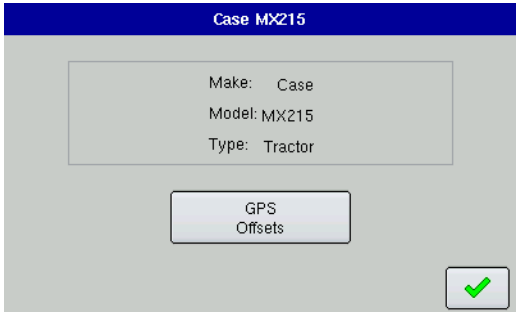
- **Add** - The Add button allows you to add a new vehicle. A wizard will walk you through setting up the vehicle.
- **Keyboard Button** - The Keyboard Button allows you to edit the name of a vehicle in the list. To edit, highlight the name of a vehicle in the list and then press this button. Then use the on-screen keyboard to edit the name.
- **Wrench Button** - The Wrench Button button opens the Vehicle Settings Screen, where you can configure GPS Offsets. For more information, *See "GPS Offsets" on page 209.*
- **Remove** - The Remove button allows you to remove a vehicle.

	Note: When deleting a vehicle all data in the regions and configurations using it will be deleted.

Vehicle Tab (continued)

GPS Offsets

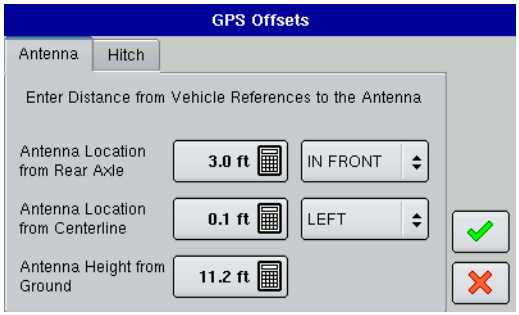
After completing the process of setting up a Vehicle, you must also configure GPS Offsets. The GPS Offsets define where machine rear axle, hitch, and product placement is in relation to the GPS antenna. These settings are used by mapping, product control, and Automatic Swath Control.



Press the **GPS Offsets** button to view **Antenna** and **Hitch** Tab GPS settings. More information can be found at *"Antenna Tab" on page 210* and also *"Hitch Tab" on page 211*.

GPS Offsets (continued)

Antenna Tab



The Antenna Tab contains three different settings.

• Measure and enter the horizontal distance from the rear axle to the position of the GPS antenna. Select **IN FRONT** or **BEHIND** from the list box to indicate the position of the antenna in relation to the rear axle.

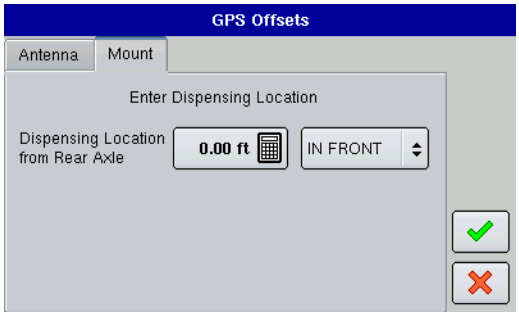
• Measure and enter the horizontal distance from the centerline of the vehicle to the position of the GPS antenna. Select **LEFT** or **RIGHT** to indicate the position from the vehicle centerline.

• Measure and enter the vertical height of the antenna above the ground.

	Note: Accuracy when measuring for a specific setting is essential to ensure proper machine performance.

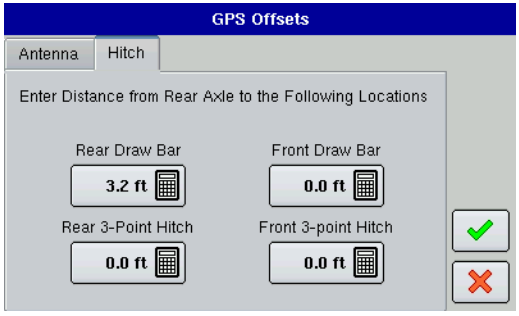
GPS Offsets (continued)

Mount Tab



The Mount Tab will only be available when using a self-propelled vehicle. This allows you to enter in the application location from the rear axle. Use the Number Pad to enter in the distance and the drop-down box to select if it is in front or behind of the axle.

Hitch Tab

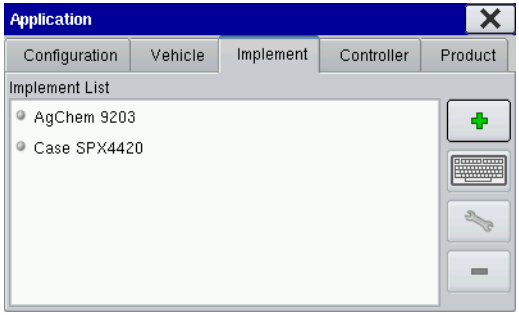


The Hitch Tab allows you to enter in the distance from one of four different mounting positions on the tractor to the rear axle. Use the Number Pads to enter a value in for the respective hitch point.

	Note: Accuracy when measuring for a specific setting is essential to ensure proper machine performance.

Implement Tab

Individual implements are set up and configured from the Implement Tab. The Implement List displays all previously-configured implements that are available for use.



- **Add** - Press to add a new implement. A wizard will walk you through setting up the implement.
- **Keyboard Button** - Press to edit the name of a selected implement from the list.
- **Wrench Button** - Press to edit the Swath Section Offsets. For more information, *See "Implement Offsets" on page 213.* This is also used to Enable Boom Height Control and access the NORAC UC5 Setup. For more information, *See "NORAC UC5 Setup" on page 291.*
- **Remove** - Press to remove a selected implement.

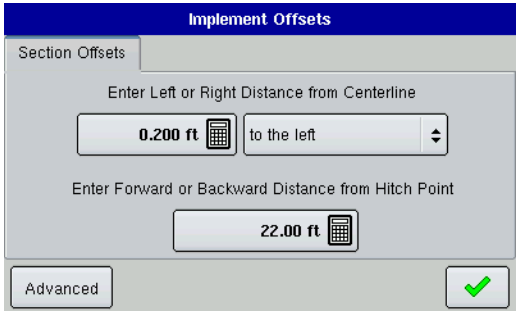
	Note: When deleting an implement all data in the regions and configurations using it will be deleted.

Implement Offsets

After you complete the initial process of configuring an Implement, you must enter accurate values in the Section Offsets to ensure proper machine performance. Section Offsets are configured as outlined in the following steps.

Section Offsets

1 Press Wrench Button. On the Implement Tab, highlight the Implement Name, press the Wrench Button, and the Implement Offsets screen appears, as shown below.



2 **Enter left or right distance from hitch point**. Use the numeric keypad to enter the distance of the midpoint of the swath section from the machine centerline. Select **Left** or **Right** to indicate the direction the swath section is located from the vehicle centerline. (This option will not be present on self-propelled vehicles.)

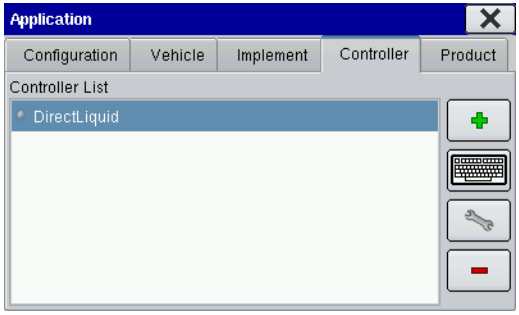
3 **Enter Forward or Backward Distance from Hitch Point.** Use the numeric keypad to enter the distance from front hitch, if present, to rear hitch point. Press the checkmark box when complete. (This option will not be present on self-propelled vehicles.)

	Note: Accuracy when measuring and entering swath section GPS offsets is required to ensure proper machine performance.

Controller Tab

Use the Controller Tab to add and configure DirectCommand controllers for use during DirectCommand application operations.

	Note: No settings are available under the Controller Tab that pertain to Area Logging (non-DirectCommand) application operations.

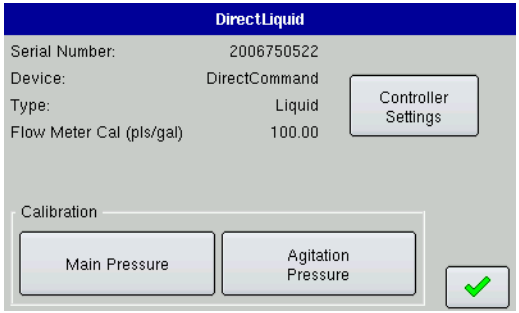


- **Add** - Press to add a new controller. A wizard will walk you through setting up the controller.
- **Keyboard Button** - Press to edit the name of a selected controller from the list.
- **Wrench Button** - Press to edit Controller Settings, including tabs for Channel 1, 2 & 3 settings, and also Auxiliary settings. For more information *See "Controller Settings (DirectCommand)" on page 215.*
- **Remove** - Press to remove a controller.

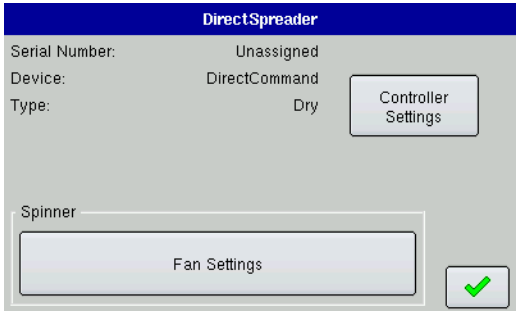
	Note: When deleting a controller all data in the regions and configurations using it will be deleted.

Controller Settings (DirectCommand)

To view Controller Settings, go to the Controller Tab, highlight the controller, press the Wrench Button, and the Controller Settings screen shows as appears below. The current Device and Serial Number of that Device is displayed. The buttons shown on this Controller Setting screen varies, depending upon your DirectCommand configuration.



Controller Settings - shown for DirectCommand Liquid Applications



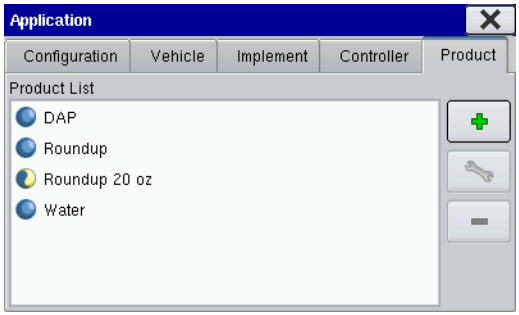
Controller Settings - shown for DirectCommand Spinner Spreader Applications

Press the **Controller Settings** button and another Controller Settings screen opens, where you can view controller settings. For more information, see the following in the Application: DirectCommand section:

- *"Liquid Application Controller Settings" on page 210*
- *"Spinner Spreader Controller Settings" on page 217*

Product Tab

The Product Tab allows you to add new products or edit existing products for planting and seeding.

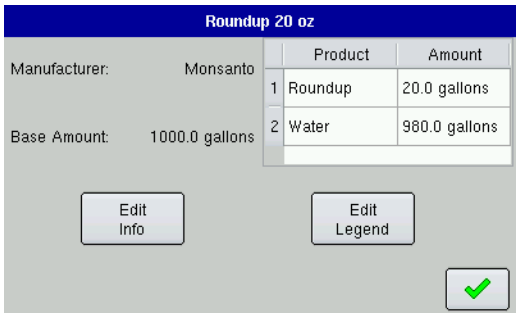


- **Add** - The Add button summons the Product Options Screen, where you can add a single-component product, add a product mix, or import the .msf file of a product from desktop software. For more information, *See "Product Options" on page 219.*
- **Wrench Button** - The Wrench Button summons the Product Screen, which is named according to your specific product. For more information, *See "Product Screen" on page 217.*
- **Remove** - The Remove button allows you to remove a product.

	Note: When deleting a product, all data in the regions using that product will be deleted.

Product Screen

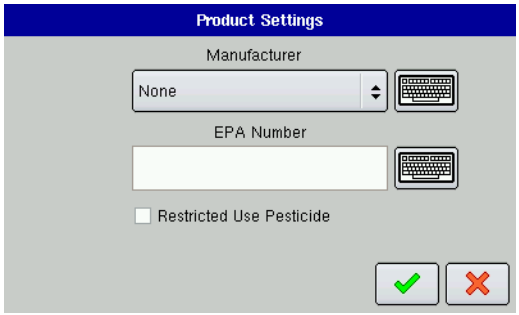
The Product Screen is where you can view Product Manufacturer information, amount, and can edit product settings and the product legend. To go to the Product Settings screen, first click on the Product Tab highlight your product configuration, and press the Wrench Button, as shown at left.



- **Edit Info** - The **Edit Info** button summons the Product Settings screen, where you can specify the manufacturer of a product in the Product Information. For more information, *See "Product Settings" on page 218.*
- **Edit Legend** - The **Edit Legend** button allows you to change the legend associated with the selected product. For more information, *See "Edit Legend" on page 34.*

Product Settings

The Product Settings screen is where you can edit product information for an existing product in the Product List. To view the Product Settings Screen, first go to the Product Tab, highlight your product configuration, press the Wrench Button and after the Product Screen opens press the **Edit Info** button, as shown at left. The Product Settings Screen appears, as shown below.



- **Manufacturer** - Enter the Manufacturer and Common Name, if desired.
- **EPA Number** - Enter the EPA Registration Number which is listed on the product's container label.
- **Restricted Use Pesticide** - If the product is a Restricted Use Pesticide, press the check box. This information will also be included for your records.

Product Options

The Product Options screen is where you can add or import products, or add product mixes. To go to the Product Options screen, press the Add button on the Product Tab. The Product Options screen appears, as shown below. Choose from the following options described below.

Product Options
ADD PRODUCT
Create a single Product to be added to a tank mix or can be applied by itself.
ADD PRODUCT MIX
Create a Tank Mix or Dry Blend of two or more products.
IMPORT PRODUCT
Import a product from a desktop MSF file.

- **Add Product**. Adds a single component product type. Here you must choose a single component product from any pre-defined types that can be created and added to the Product List. After initial setup, single component products can be used individually within the EDGE system, or can be combined to create dry blends and liquid product mixes. If you are creating a Restricted Use Pesticide, enter the EPA product registration number and select the RUP check box where appropriate.
- **Add Product Mix**. Adds a mix of products, either a tank mix or dry blend. For more information, see *See "Tank Mix Setup" on page 220.* and *See "Dry (Granular) Fertilizer Blend Setup" on page 221.*
- **Import Product**. Imports a Management Setup File (.msf) from desktop software. Follow the steps in the wizard to enter the Product, Type and Units and Density of the Product. Enter the EPA Registration Number (if necessary), the Manufacturer and Common Name, and the Product Name.

Tank Mix Setup

Tank Mixes are set up by using the on-screen wizard. A tank mix can contain up to seven individual components. To create a Tank Mix, go to the Product Options Screen and press **Add Product Mix.** The Product Mix Setup Wizard appears, as shown below.

1. Select **Tank Mix** from the list box and press the blue right-arrow button to continue.
2. Enter a Base Amount and Units.

	Note: The Base Amount is the total volume of all the components of the tank mix. The Base Amount does not need to match the actual volume of product that will be sprayed, but is used only to establish the ratio of all products to the total volume.

3. Press the **Add** button to start the process of adding components to the tank mix. Select a desired mix component from the list box (or press **New** to set up the product). Enter the Base Amount of the mix component.
4. Repeat this process for the second mix component, if necessary.
5. Add a product carrier and an amount for that carrier by following the steps shown in the wizard.
6. Last, enter a unique name for the tank mix. The new mix will appear in the Product List. The mix name will appear next to a blue and cream-colored “Tao” symbol (a circle with a curved line through it), as shown at left.

Dry (Granular) Fertilizer Blend Setup

Dry fertilizer blends are set up by using the on-screen wizard described in the following steps. A dry blend can contain up to seven individual components. To create a Dry Fertilizer Blend, go to the Product Options Screen and press the **Add Product Mix** button. The Product Mix Setup Wizard appears, as shown below.

7 Select **Dry Blend** from the list box and press the blue right-arrow button to continue.

8 Enter a Base Amount of product and the controlling Units for the dry product blend. Press the blue right-arrow button to continue.

	Note: The Base Amount is the total weight of product for the fertilizer blend. The Base Amount does not need to match the actual volume of product that will be applied, but is used only to establish the ratio of all products to the total volume.

9 Press the **Add** button to start the process of adding components to the fertilizer blend.

	Note: Any liquid herbicides set up within the system can be added to create an impregnated blend product.

10 Select the desired component from the list box. New components can be set up at this time if required.

Dry (Granular) Fertilizer Blend Setup (continued)

11 Enter the amount of the first component.

12 Press **Add** to start adding an additional component. (A dry mix can contain up to seven individual components.)

	Note: The remaining Base Amount that is available after adding product components is shown at the bottom of the on-screen list box.

13 Select the second component for the dry mix, and enter the base amount of the second component. Press the blue right-arrow button after the final blend component has been added.

14 Enter Manufacturer name if applicable.

Use the on-screen keyboard to enter a unique name for the blend. Press the checkmark box to complete the process of setting up the dry blend. The new Dry Blend now appears in the Product List.

Miscellaneous Items

Fertilizer Default Product Settings

			Percentage (in terms of lbs./100 lbs)			
Material	**Type**	**Abbreviated name for EDGE and predefined name for SMS**	**N**	**P ($P_2 0_5$)**	**K ($K_2 0$)**	**Density**
Anhydrous Ammonia	Liquid under pressure	NH_3	82	0	0	5.14 lbs./gal. (at 60 F)
28% UAN	Liquid	28% UAN	28	0	0	10.67 lbs./gal.
30% UAN	Liquid	30% UAN	30	0	0	10.86 lbs./gal.
32% UAN	Liquid	32% UAN	32	0	0	11.06 lbs./gal.
Ammonium polyphosphate (starter)	Liquid	Ammonium polyphosphate	10	34	0	11.73 lbs./gal.
Ammonium nitrate	Dry	Ammonium nitrate	34	0	0	N/A
Ammonium phosphate	Dry	Ammonium phosphate	10	34	0	N/A
DAP	Dry	DAP	18	46	0	N/A
MAP	Dry	MAP	11	52	0	N/A
Ammonium sulfate	Dry	Ammonium sulfate	21	0	0	N/A
Urea	Dry	Urea	46	0	0	N/A
Potash	Dry	Potash	0	0	60	N/A

Fertilizer Product Default Settings (continued)

			Percentage (in terms of lbs./100 lbs)			
Material	**Type**	**Abbreviated name for EDGE and predefined name for SMS**	**N**	**P (P_2O_5)**	**K (K_2O)**	**Density**
Triple superphosphate	Dry	Triple superphosphate	0	46	0	N/A
Ordinary superphosphate	Dry	Superphosphate	0	20	0	N/A
Potassium nitrate	Dry	Potassium nitrate	13	0	44	N/A

John Deere Specific Instructions

Here are some tips to remember when operating the EDGE display in conjunction with a Spray Star control system. Refer to the quick reference sheet PN: 2002831-38 and other sections of the user guide for specific setup and operation instructions.

MASTER SWITCH INPUT

After setting up a configuration in the display make sure to change the master switch input setting from standard to optional. This will tell the EDGE to read the foot pedal for the master switch input status.

MASTER SWITCH USAGE

When manually shutting off all boom sections in the field, use the foot pedal switch.

Leave the OEM master switch on the hydro handle ON during field use. Using the hydro handle switch may lead to improper field coverage, poor AutoSwath performance, and inaccurate spray records. Only use the John Deere master switch when completely shutting down the sprayer to transport or service the machine.

EDGE TARGET RATE

The EDGE must have a non-zero target rate entered in the display before the boom valves will open for product application. Ensure that the target rate entered into the EDGE and Spray Star match to avoid any unwarranted alarms or warnings on the display.

EDGE DATA COLLECTION

The EDGE will create a coverage map of all product application while logging actual application rate from the product control system flow meter.

EDGE AUTOSWATH BOOM SECTION CONTROL

The EDGE will automatically control the boom section on/off status based upon previously-applied area, field boundary, and any mapped internal field boundaries.

John Deere Specific Instructions (continued)

SPRAY STAR APPLICATION RATE

The EDGE will not control the rate based upon the target rate value entered into the system.

Application rate is controlled exclusively by the Spray Star display.

SPRAY STAR RINSE CYCLE

When using the rinse cycle feature on the Spray Star, the EDGE must have the boom sections on to allow the Spray Star to properly run the rinse routine. To ensure that boom sections are on:

1. Enter a target rate into the EDGE display
2. Turn the foot pedal master switch on
3. Turn all boom switches on
4. Boom indicators on the EDGE Run Screen must be blue showing that boom valves are on

Control Valve Settings

Liquid Product Control Valve Configuration Options

Control Method	Description
Inline Servo	Rate control is achieved through actuating a butterfly or ball valve found in the solution hose that goes to the booms. When the valve opens, the flow increases and when the valve closes, the flow decreases.
Bypass Servo	Rate control is achieved through actuating a butterfly or ball valve found in the return line to the solution tank. When the valve opens, the flow decreases and when the valve closes the flow increases.
PWM 12 Volt	Rate control is achieved through speed changes to the solution pump. The PWM 12 Volt setting is programmed to pulse the power to an electric solenoid valve used to adjust the hydraulic flow to the solution pump.
Pump Servo	Rate control is achieved through speed changes to the solution pump. The pump servo setting is programmed to control an electric motor used to actuate a hydraulic valve to adjust the hydraulic flow to the solution pump.
PWM Ground	Rate control is achieved through speed changes to the solution pump. The PWM Ground setting is programmed to pulse the ground to an electric solenoid valve used to adjust the hydraulic flow to the solution pump.
Calibrated Reflow	Three-way boom valves are used to return product back to the tank in the off state. The returned flow is calibrated with adjustment at each valve. Calibration is required any time the nozzles are changed.
Ramsey Valve	A pneumatically-operated bypass valve. When air is supplied to the valve the rate increases; when air is released from the valve the rate decreases.

Servo Control Valve Settings (By Manufacturer)

Flow Control Valve	Control Valve Configuration	Valve Response 1	Valve Response 2	Response Threshold
Raven Accu-Flow 20 GPM Single Valve System (Fast Close Valve)	In-line servo	40%	10%	5
Raven Accu-Flow 10 GPM Dual Valve System (Standard Valve)	In-line servo	100%	24%	5
Raven Accu-Flow 30 GPM Single Valve System (Fast Close Valve)	In-line servo	40%	10%	5
Raven Accu-Flow 30 GPM Dual Valve System (Standard Valve)	In-line servo	100%	24%	5
Raven Flow Control Valve, 3/4" (Standard Valve)	In-line or Bypass servo	100%	24%	1
Raven Flow Control Valve, 3/4" (Fast)	In-line or Bypass servo	40%	10%	5
Raven Flow Control Valve, 1" (Standard)	In-line or Bypass servo	100%	24%	2
Raven Flow Control Valve, 1" (Fast)	In-line or Bypass servo	40%	10%	5
Raven Flow Control Valve 1, 1/2" (Standard)	In-line or Bypass servo	100%	24%	3
Raven Flow Control Valve, 2" (Standard)	In-line or Bypass servo	100%	24%	8

Servo Control Valve Settings By Manufacturer (continued)

Flow Control Valve	Control Valve Configuration	Valve Response 1	Valve Response 2	Response Threshold
Raven Flow Control Valve, 2" (Fast)	In-line or Bypass servo	40%	10%	15
Raven Flow Control Valve 3" (Standard)	In-line or Bypass servo	100%	24%	15
Mid-Tech 3/4"	In-line or Bypass servo	40%	10%	5
Mid-Tech, 1"	In-line or Bypass Servo	40%	10%	8
Mid-Tech, 1 1/2"	In-line or Bypass Servo	40%	10%	11
Mid-Tech, 2"	In-line or Bypass Servo	40%	10%	15
Dickey-john Nh3 Heat Exchanger	In-line Servo	40%	10%	8

Control Valve Settings for Self-Propelled Sprayers

Flow Control Valve or Sprayer Model (and year if applicable)	Control System	PWM Frequency	Typical Gain Range	Zero Offset	Allowable Error	Valve Response 1	Valve Response 2	Response Threshold
Apache 510/710 1010/1210 (2006 and up)	In-line servo				2%	100%	24%	Use a starting value of 5.* See note below.
All Case IH sprayers when using AIM Command.	AIM Command In-line servo				2%	100%	24%	3
Case IH Surveyor with A-Post.	Non-AIM Command Mode PWM 12-volt.	122	**700-900	35	2%			
Case IH 3320	Non-AIM Command Mode PWM 12-volt	122	**700-900	35	2%			

*Adjust this number to fit your particular configuration.

**If you are using a PWM Control Valve, some adjustment may need to be made to achieve optimal pump response to the PWM Gain Value. Increase the Gain Value to make the system more responsive; decrease the Gain Value to smooth the system response.

Control Valve Settings for Self-Propelled Sprayers (continued)

Flow Control Valve or Sprayer Model (and year if applicable)	Control System	PWM Frequency	Typical Gain Range	Zero Offset	Allowable Error	Valve Response 1	Valve Response 2	Response Threshold
Case IH 4420 with A-Post	Non-AIM Command Mode PWM 12-volt	122	**700-900	35	2%			
Case IH 3200 (KZCO Valve)	Non-AIM Command Mode By-Pass Servo				2%	40%	10%	5
Case IH 4260 with Raven valve	Non-AIM Command Mode By-Pass Servo				2%	100%	24%	3
Case IH 4260 with KZCO valve	Non-AIM Command Mode By-Pass Servo				2%	40%	10%	5

**If you are using a PWM Control Valve, some adjustment may need to be made to achieve optimal pump response to the PWM Gain Value. Increase the Gain Value to make the system more responsive; decrease the Gain Value to smooth the system response.

Control Valve Settings for Self-Propelled Sprayers (continued)

Flow Control Valve or Sprayer Model (and year if applicable)	Control System	PWM Frequency	Typical Gain Range	Zero Offset	Allowable Error	Valve Response 1	Valve Response 2	Response Threshold
Case 3150 with Raven valve.	Non-AIM Command Mode In-Line servo				2%	100%	24%	3
Case IH 3185 with Raven valve.	Non-AIM Command Mode In-Line Servo				2%	100%	24%	3
Case 3310	Non-AIM Command Mode PWM 12-volt	122	*700-900	30	2%			
Case 4410	Non-AIM Command Mode PWM 12-Volt	122	**700-900	30	2%			
GVM Prowler (2007)	Pump servo				2%	100	24	10

**If you are using a PWM Control Valve, some adjustment may need to be made to achieve optimal pump response to the PWM Gain Value. Increase the Gain Value to make the system more responsive; decrease the Gain Value to smooth the system response.

Control Valve Settings for Self-Propelled Sprayers (continued)

Flow Control Valve or Sprayer Model (and year if applicable)	Control System	PWM Frequency	Typical Gain Range	Zero Offset	Allowable Error	Valve Response 1	Valve Response 2	Response Threshold
GVM Predator (2007)	Servo				2%	100%	24%	*See note below.
Hagie 284, 284XP, DTS-8	Pump Servo				2%	100%	24%	3
Hagie 2100, 2010, DTS-10	Pump Servo				2%	100%	24%	3
Hagie STS 10, & STS 12, (2000-2005)	Pump Servo				2%	100%	24%	20
Hagie STS 10, 12, 14, & 16 (2006 and up)	PWM 12-volt	122	**350-600	20	2%			

*Adjust this number to fit your particular configuration.

**If you are using a PWM Control Valve, some adjustment may need to be made to achieve optimal pump response to the PWM Gain Value. Increase the Gain Value to make the system more responsive; decrease the Gain Value to smooth the system response.

Control Valve Settings for Self-Propelled Sprayers (continued)

Flow Control Valve or Sprayer Model (and year if applicable)	Control System	PWM Frequency	Typical Gain Range	Zero Offset	Allowable Error	Valve Response 1	Valve Response 2	Response Threshold
Hardi 39-pin Spray II switch box (2006 and 2007)	Calibrated Reflow				2%	100%	40%	2
John Deere 4700, 47X0, 49X0	No rate control provided							
Miller Nitro N1 and N2	Pump Servo				2%	100%	24%	20
Miller Nitro N4	Pump Servo				2%	100%	24%	12
Montana Paruda (2007)	Calibrated Reflow				2%	100%	40%	2 (Imperial) or 11.4 (Metric)
RoGator 864, 874, 1064, 1074	PWM Ground	122	**500-700	30	2%			

**If you are using a PWM Control Valve, some adjustment may need to be made to achieve optimal pump response to the PWM Gain Value. Increase the Gain Value to make the system more responsive; decrease the Gain Value to smooth the system response.

Control Valve Settings for Self-Propelled Sprayers (continued)

Flow Control Valve or Sprayer Model (and year if applicable)	Control System	PWM Frequency	Typical Gain Range	Zero Offset	Allowable Error	Valve Response 1	Valve Response 2	Response Threshold
RoGator 1054	Pump Servo				2%	100%	24%	3
RoGator 1254	Pump Servo				2%	100%	24%	3
RoGator 1264, 1274 (up to 2006)	PWM Ground	122	**500-700	30	2%			
RoGator 1274, 1286 and SS Series (2007 and up)	PWM Ground	122	**500-700	30	2%			
Spra-Coupe 3X40, 3X50, 4X40, 4X50	In-Line Servo				2%	100%	24%	3
Spra-Coupe 7000 with factory pump switch	PWM Ground	122	**500-700	30	2%			

**If you are using a PWM Control Valve, some adjustment may need to be made to achieve optimal pump response to the PWM Gain Value. Increase the Gain Value to make the system more responsive; decrease the Gain Value to smooth the system response.

Control Valve Settings for Self-Propelled Sprayers (continued)

Flow Control Valve or Sprayer Model (and year if applicable)	Control System	PWM Frequency	Typical Gain Range	Zero Offset	Allowable Error	Valve Response 1	Valve Response 2	Response Threshold
Spra-Coupe 7000 without factory pump switch	PWM Ground	122	**500-700	30	2%			
TerraGator XX03, XX04, XX44	In-Line Servo				2%	40%	10%	15
Tyler Patriot	Check for In-Line Servo or By-Pass Servo Control				2%	100%	24%	3
Walker	Pump Servo				2%	100%	24%	3

**If you are using a PWM Control Valve, some adjustment may need to be made to achieve optimal pump response to the PWM Gain Value. Increase the Gain Value to make the system more responsive; decrease the Gain Value to smooth the system response.

Liquid Servo Settings Description

Setting Name	Default Setting	Setting Description	Setting Characteristics
Valve Response 1	100%	Determines the speed of the servo valve when product control error exceeds the Response Threshold setting.	Decreasing the value will cause the servo valve to run slower.
Valve Response 2	24%	Determines the speed of the servo valve when product control error is less than the Response Threshold setting.	Decreasing the value will cause the servo valve to run slower.
Allowable Error	2%	Determines the percent of error that is allowed prior to the product control system making any flow rate corrections.	2% - 3% is the normal dead band setting range. • Too low of a setting value can cause the product control system to continually hunt for the target application rate. • Too high of a setting will cause excessive product application error.
Response Threshold	3	Determines where the control system switches between using Valve Response 1 or Valve Response 2 speed setting.	Leaving all other valve control settings at the default value and making a small adjustment to this setting is usually all that is required to fine-tune system performance. • Decreasing this value will have the overall effect of speeding up servo valve response. • Increasing this value will have the overall effect of slowing servo valve response.

Liquid PWM Control Valve Settings Description

Setting Name	Default Setting	Setting Description
PWM Frequency	100	The frequency that the PWM control valve is pulsed at. Typical settings range from 100 - 125. See PWM valve manufacturer information for recommended settings.
Gain	800	This setting determines how aggressively the control valve responds when making rate change adjustments.
Zero Offset	30	This setting represents the maximum duty cycle that is sent to the control valve without producing any hydraulic flow from the PWM valve. Using too high of a Zero Offset value can cause the product control system to not properly shut off. See PWM valve manufacturer information for recommended settings.
Allowable Error	2%	2% - 3% is the normal dead band setting range. • Too low of a setting value can cause the product control system to continually hunt for the target application rate. • Too high of a setting will cause excessive product application error.

Spinner Spreader Servo Settings Description

Setting Name	Default Setting	Setting Description	Setting Characteristics
Valve Response 1	40%	Determines the speed of the servo valve when product control error exceeds the Response Threshold setting.	Decreasing the value will cause the servo valve to run slower.
Valve Response 2	8%	Determines the speed of the servo valve when product control error is less than the Response Threshold setting.	Decreasing the value will cause the servo valve to run slower.
Allowable Error	2%	Determines the percent of error that is allowed prior to the product control system making any conveyor RPM corrections.	2% - 3% is the normal dead band setting range. • Too low of a setting value can cause the product control system to continually hunt for the target application rate. • Too high of a setting will cause excessive product application error.
Response Threshold	15	Determines where the control system switches between using the Valve Response 1 or Valve Response 2 speed setting.	Leaving all other valve control settings at the default value and making a small adjustment to this setting is usually all that is required to fine-tune system performance. • Decreasing this value will have the overall effect of speeding up servo valve response. • Increasing this value will have the overall effect of slowing servo valve response.

Spinner Spreader PWM Control Valve Settings Description

Setting Name	Default Value	Description
PWM Frequency	100	The frequency that the PWM control valve is pulsed at. Typical settings range from 100 - 125. See PWM valve manufacturer information for recommended settings.
PWM Gain	20	This setting determines how aggressively the control valve responds when making spinner speed adjustments. The higher the value the more aggressive the system response is.
Zero RPM Offset	30	This setting represents the maximum duty cycle that is sent to the control valve without producing any hydraulic flow from the PWM valve. Using too high of a Zero RPM Offset value can cause the spinner system to not properly shut off. See PWM valve manufacturer information for recommended settings.
Allowable Error	2%	2% - 3% is the normal dead band setting range. • Too low of a setting value can cause the product control system to continually hunt for the target application rate. • Too high of a setting will cause excessive product application error.

Spinner Speed PWM Control Valve Settings Description

Setting Name	Default Value	Description
Fan Speed Cal	4	The Fan Speed Cal number is the number of pulses that are generated by the sensor during one revolution of the spinner dish.
PWM Frequency	100	The frequency that the PWM control valve is pulsed at. Typical settings range from 100 - 125. SEe PWM valve manufacturer information for recommended settings.
PWM Gain	20	This setting determines how aggressively the control valve responds when making rate change adjustments. The higher the value the more aggressive the system response is.
Zero RPM Offset	30	This setting represents the maximum duty cycle that is sent to the control valve without producing any hydraulic flow from the PWM valve. Using too high of a Zero Flow Offset value can cause the product control system to not properly shut off. See the PWM valve manufacturer's information for recommended settings.
Allowable Error	2%	2% - 3% is the normal dead band setting range. • Too low of a setting value can cause the product control system to continually hunt for the target application rate. • Too high of a setting will cause excessive product application error.
Auto Control Check Box	Default is unchecked	Checking the Auto Control check box allows you to control the spinner speed.

Dickey John NH3 Conversions

CONVERSION FORMULAS

Conversion Formula
*Formula for flow meter calibration for Dickey John reading pounds of annhydrous $\frac{\text{Flow sensor constant (pulses/in}^3\text{) x 1728 (in}^3\text{/ft}^3\text{) x 5.11 (lbs of anhydrous/gal)}}{\text{Density (lbs of anhydrous/ft}^3\text{)}}$ *Formula for flow meter calibration for Dickey John reading pounds of Nitrogen $\frac{\text{Flow sensor constant (pulses/in}^3\text{) x 1728 (in}^3\text{/ft}^3\text{) x 4.22 (lbs of N/gal)}}{\text{Density (lbs of N/ft}^3\text{)}}$

	Note: The flow sensor constant is tagged on the Dickey-john flow meter. The density setting comes from a chart in the Dickey-john documentation and is not provided in this manual.

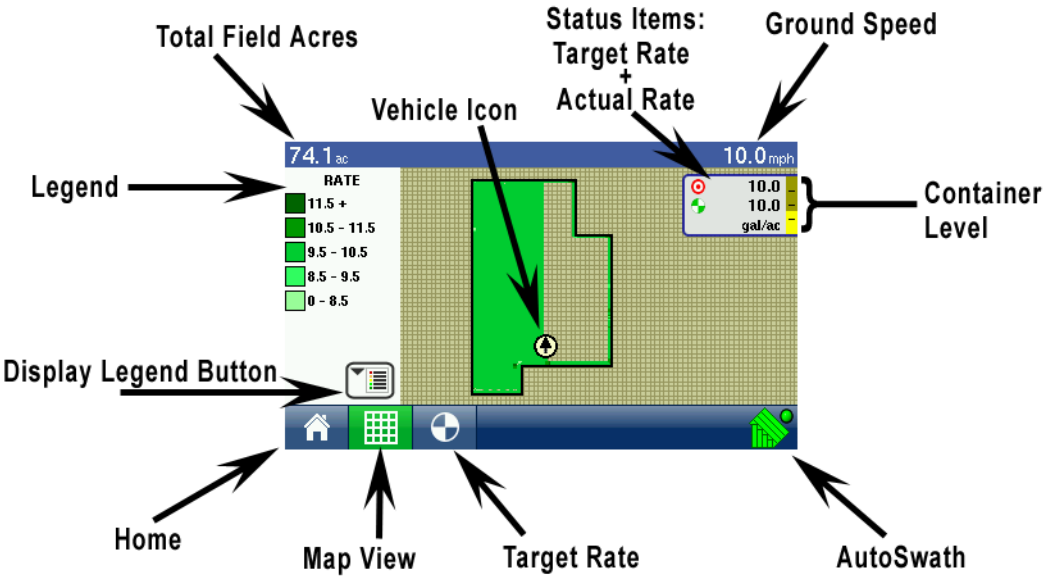
Application: DirectCommand™ Machine-Specific Setup

DirectCommand™ provides variable rate application control over liquid, dry or anhydrous application. You apply product where it will benefit your crop most and apply less where it won't. This subsection describes the following DirectCommand features:

- **Map Screen** functions, beginning on *"Map Screen: Zoom to Extent" on page 244*.
- **Rate Screen** functions, beginning on *"Run Time Environment: Rate Screen" on page 247*.
- **Loading Prescription Files** beginning on *"Loading Prescriptions" on page 257*.
- **Shape File Conversion** beginning on *"Shape File Conversion" on page 258*.
- **Liquid Application Control** beginning on *"Liquid Application Control" on page 261*.
- **Direct Injection** beginning on *"Direct Injection" on page 271*.
- **Spinner Spreader Granular Control** beginning on *"Spinner Spreader Granular Control" on page 282*.
- **NORAC UC5 Boom Height Control** beginning on *"NORAC UC5 Setup" on page 291*.
- **Troubleshooting** information, beginning on *"Troubleshooting" on page 297*.

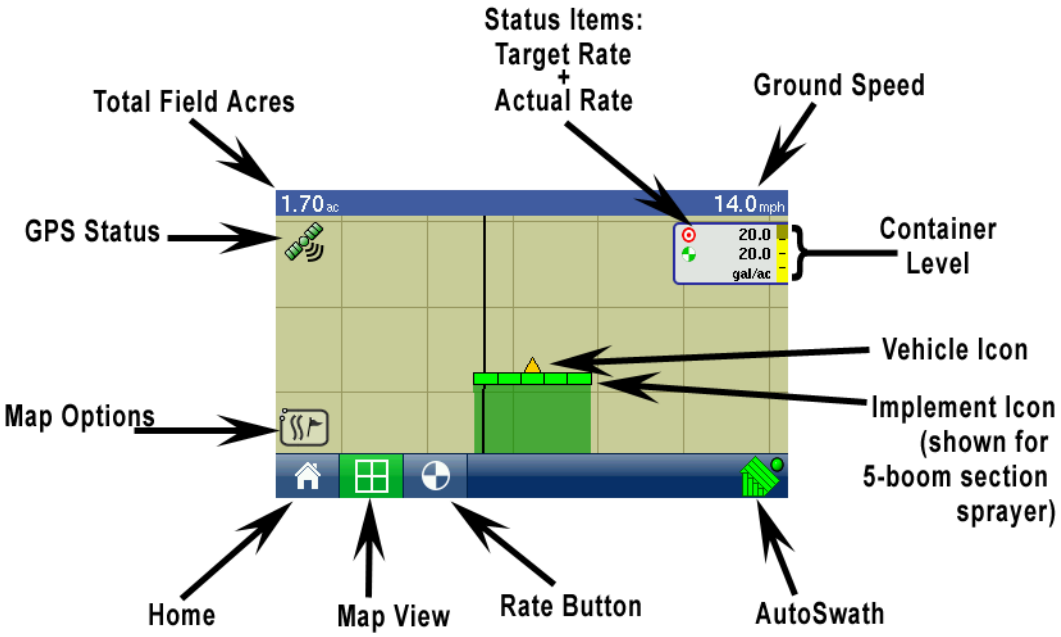
Map Screen: Zoom to Extent

The map below is shown for a DirectCommand configuration. The Display Legend icon has been pressed to show the Rate Legend at left. At right, the Container Level shows that the container is half-full.



Map Screen: Zoom Detail

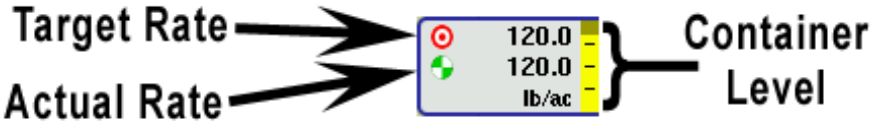
The map below is shown for a Sprayer with DirectCommand features. This sprayer includes 5 sections, and these sections are shown as individual boxes on the Implement Icon behind the Vehicle Icon.



Application Map Screen Items

The following Application Map Screen Items are available for DirectCommand users at the Map Screen:

- **Status Items: Target Rate and Actual Rate** - Two items, Target Rate and Actual Rate, appear in the Status Items box at the top right-hand corner of the Map Screen. As with the Legend, the Status Items are only accessible in the Zoom to Extent view.



- **Container Level** - The Container Level Status Item allows you to view the amount of product remaining in your container. For more information, *See "Rate Screen: Container Level" on page 248.*
- **Rate Button** - The Rate Button summons the Rate Screen, where you can view settings related to Target Rate, Tank Volume, and Flow/Pressure. For more information, *See "Run Time Environment: Rate Screen" on page 247.*

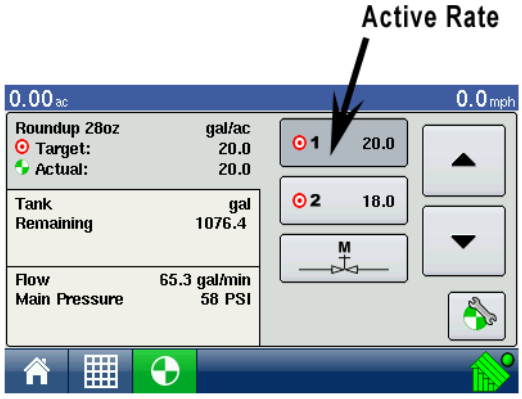
	Note: For an explanation of display items not listed above, *See "Map Screen Icons" on page 37.*

Run Time Environment: Rate Screen

You can view the Rate screen by pressing the Rate button, as shown at left. The Rate Screen has three active areas: Target Rate, Tank Volume, and the third area shows Flow/Pressure (for Liquid applications) and Bin (for Spinner Spreader applications). These items are explained on this and following pages.

Target Rate

The Target Rate screen will appear for all target rates being applied.



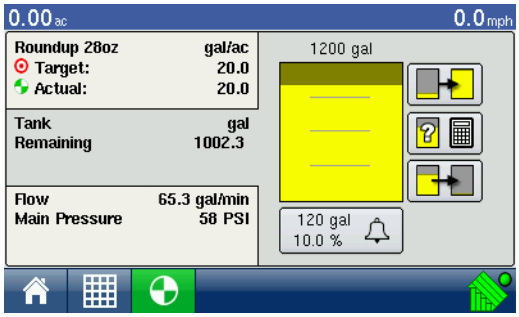
- **Target Rate** - The Target Rate is the amount of product that you wish to apply.
- **Actual Rate** - The Flow Sensor returns the actual rate of the product that you are applying.

	Note: In some conditions, the Actual Rate may increment slower than the Target Rate, or its numeric values may vary before matching the Target Rate.

- The Rate 1 and Rate 2 settings represent preset application rates that allow operators to quickly change between desired target rates for each individual product.
- The Manual Valve Control button, as shown at left, allows operators to specify the position of the control valve. Operators use this option to prime the system before application or clean out equipment at the end of the day.

Rate Screen: Container Level

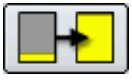
When filling or emptying your container, you can use the Container Level portion of the Rate Screen to update the amount of product that exists in the machine's containers.



Container (Shown Partially Full)

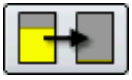
Container (Shown Empty)

Tank Fill



The Tank Fill button, as shown at left, increases the container level logged in the EDGE system to the maximum volume that you specified in the Container Setup Wizard shown in the Configuration procedure.

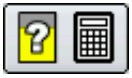
Tank Empty



The Tank Empty button, as shown at left, decreases the container level logged in the EDGE system to zero.

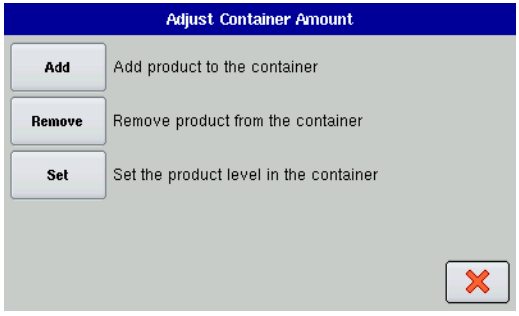
Rate Screen: Tank Container Level (continued)

Tank Partial Fill



The Tank Partial Fill button, as shown at left, increases the container level logged in the EDGE system to specific amount that you specify in the numeric keypad. Pressing the Partial Fill button summons the Adjust Container Amount Screen, as shown below.

Adjust Container Amount



- **Add** - Adds product to the container. Use the numeric keypad to enter the amount.
- **Remove** - Removes product from the container. Use the numeric keypad to enter the amount.
- **Set** - Sets the product level in the container. This button summons a numeric keypad, where you can set a certain amount. Choose an amount that is below your maximum container level.

Rate Screen: Tank Container Level (continued)

Tank Alarms

The Container Alarm button, which appears at the bottom of the Container Level portion of the Rate Screen (as shown at left), displays the capacity of your tank as well as the percentage at which the Low Container Level warning will sound. To adjust these settings, press the button and the Container Alarm Screen appears, as shown below.

Container Alarm Screen

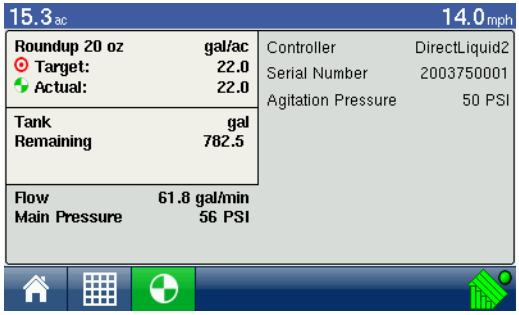
If you wish to adjust your container level warnings, use the following buttons on the right-hand side of the Container Alarm Screen to make these adjustments.

- The percentage (**%**) button sets the warning threshold according to the percentage of solution left in the tank. In the example above, the threshold is set at 10 percent.
- The units of measurement icon sets the warning threshold according to the amount of solution left in the tank. This icon is named according to the container's units of measurement you specified during the Controller configuration procedure.
- The Disable Low Container Level button, which appears as a bell with a red slash across it (as shown at left), disables the Low Container Level warning.

Press the checkmark box to return to the Rate Screen.

Rate Screen: Liquid Flow/Pressure

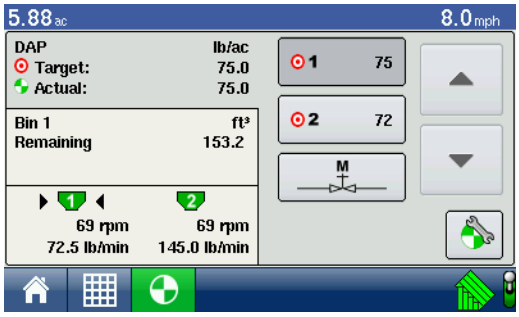
DirectCommand users applying liquid products can use the bottom active area of the Rate Screen to view settings for Flow, Main Pressure, and Agitator Pressure. This screen also displays the Serial Number of your DirectCommand Liquid Product Controller.



Rate Screen: Spinner Spreader Settings

DirectCommand users applying granular products with a Spinner Spreader can use the bottom active area of the Rate Screen to view Fan Speed, adjust Product Settings and Spreader Control settings.

The Rate Screen below is shown for a two-channel Spinner Spreader. The channel that you wish to view is shown in a bin-shaped icon placed between two wedge shapes.



⚠CAUTION	*Changing any of these settings in the EDGE display does not make the needed adjustments on the product applicator. Setting value and physical setting on the spinner bed must be verified for correctness prior to any product application.*

- Information on **Product Settings** is described on *See "Spinner Spreader Product Settings" on page 253.*
- Information on **Spreader Control** settings is described on *See "Spreader Control" on page 255.*

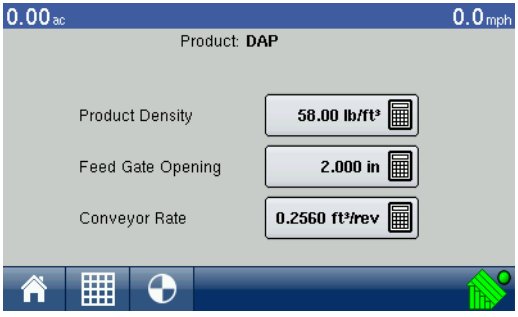
Rate Screen: Spinner Spreader Product Settings and Spreader Control (continued)

Spinner Spreader Product Settings

Spinner Spreader Product Settings can be accessed by pressing the **Product Settings** button, located at the bottom active area of the Rate Screen.

Notes:

- Each of these settings described below and at *"Spreader Control" on page 255* must be set for each individual Product Channel (bin).
- Changing any of these settings in the EDGE display does not make the needed adjustments on the product applicator. Setting value and physical setting on the spinner bed must be verified for correctness prior to any product application.
- The **Spread Width**, **Spinner Speed, Product Density, Feed Gate 1 Opening** and the **Conveyor 1 Rate** are all stored with each combination of product and control channel.



- **Product Density** - This density value (shown in pounds per cubic foot, or lb./ft.3), is stored with each product. Use the keypad to edit if needed.

	Note: For proper machine performance and accuracy, you should check the Product Density daily.

- **Feed Gate Opening** - Represents the Feed Gate opening for the conveyor. Measure the depth of product on the conveyor to ensure accurate feed gate setting value.

Rate Screen: Spinner Spreader Product Settings and Spreader Control (continued)

- **Conveyor Rate** - This setting represents the volume of product dispensed by one revolution of the conveyor drive shaft (cubic foot per revolution, or ft.3 /rev.) This number is shown with the assumption that the conveyor shaft has a 1-inch gate opening. This conveyor rate remains constant, regardless of the height of the feed gate opening.

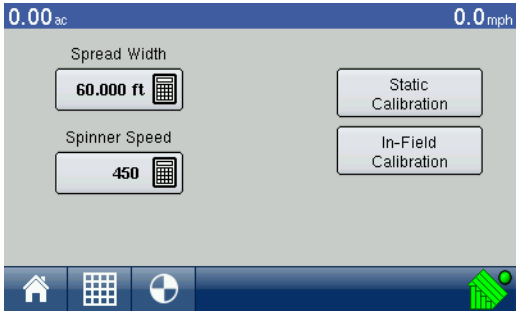
⚠CAUTION	*New products will have a default CFR number the first time they are used. You must either manually enter or perform a CFR calibration routine for each product once that product is created, otherwise mis-application will occur.*

Rate Screen: Spinner Spreader Product Settings and Spreader Control (continued)

Spreader Control

Spreader Control Settings can be accessed by pressing the **Spreader Control** button, located at the bottom active area of the Rate Screen.

	Note: The Spread Width, Spinner Speed Product Density, Feed Gate 1 Opening and the Conveyor 1 Rate are all stored with each combination of product and control channel.



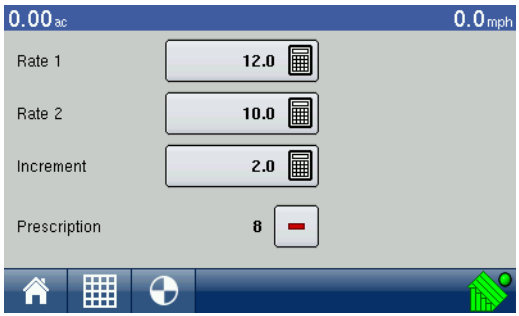
- **Spread Width** - Use the numeric keypad to edit the value.
- **Spinner Speed** - The spinner speed required for accurate product placement in relation to the spread width setting.

	Note: The spinner speed is controlled automatically based upon this setting when the system uses an optional PWM spinner speed control valve.

- **Static Calibration** - Press the **Static Calibration** button to summon the Conveyor Rate Calibration Wizard, which will guide you through the Spinner Spreader Conveyor Rate Calibration process.
- **In-Field Calibration** - Press the **In-Field Calibration** button to summon the In-Field Calibration Wizard, which will guide you through the In-Field Conveyor Rate Calibration process.

Application Rate Control Configuration Screen

Application Rate Control Configuration Button - The Application Control Configuration button, which appears on the Rate Screen as shown at left, summons the Application Rate Control Configuration screen, shown below.



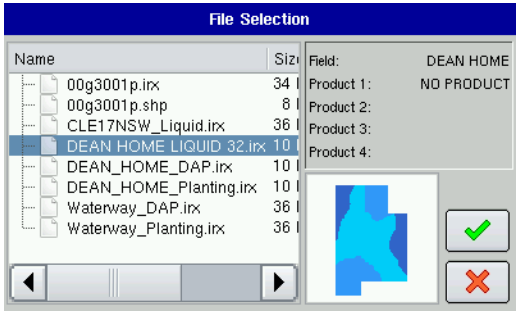
- **Rate 1 & Rate 2** - The Rate 1 and Rate 2 settings represent preset application rates that allow operators to quickly change between desired target rates for each individual product. Use the numeric keypad to enter the desired amount.
- **Increment** - The Increment button allows operators to specify the increase or decrease amounts used when Rate 1 or Rate 2 is selected. Use the numeric keypad to enter the desired increment.
- **Prescription** - To load a map-based prescription file, press the **Prescription** button. For more information, *See "Loading Prescriptions" on page 257.*

Loading Prescriptions

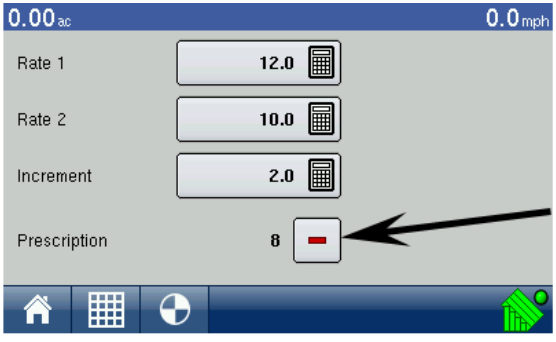
To load a map-based prescription file, go to the Rate Screen, press the Application Configuration button and the Application Rate Control Configuration screen appears.

1 Press the Prescription button, as shown at left. The File Selection screen opens, as shown below.

2 Choose either an .irx (prescription) file or a .shp (shape) file from the names list. Press the checkmark box when complete.



3 Once selected, the Prescription button on the Application Rate Control Configuration Screen will change its appearance to the Remove Prescription button, which appears as a minus sign. This will allow you to clear out the selected prescription. (For an example, see below).



Default prescription rate and Remove Prescription button both shown

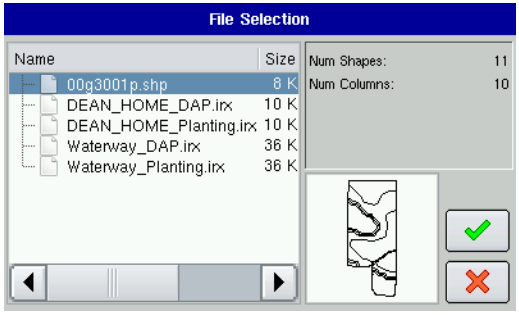
Shape File Conversion

What is commonly called a shape file is actually a collection of three different files. All three of the files are required and must be present on the external storage card for the system to use shape file groups for variable rate product application. A single "shape file" can contain recommendation rates for multiple products.

To begin, go to the Rate Screen, press the Application Configuration button and the Application Rate Control Configuration screen appears.

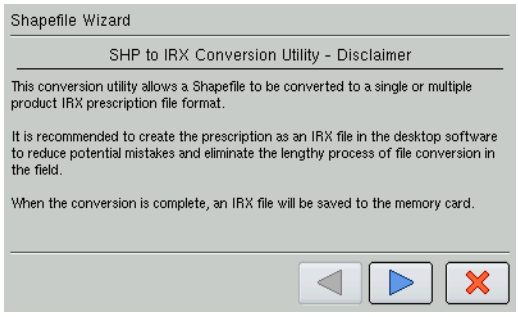
1 **Open File Selection Screen**. Press the Prescription button, as shown at left. The File Selection screen opens, as shown below.

2 **Select Shape File**. Select the desired .shp file for conversion. Press the checkmark box when complete.

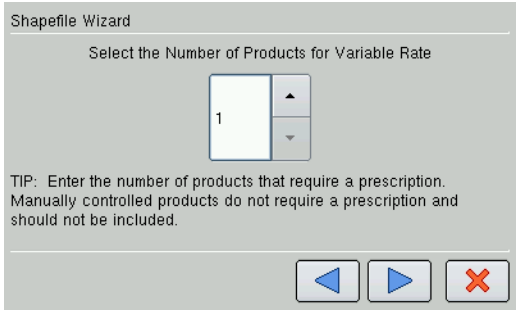


Shape File Conversion (continued)

3 **Read instructions and disclaimer**. Read instructions and disclaimer regarding the shape file conversion process. User knowledge of the column name containing the product recommendation is required to complete this process. Press the blue right-arrow button to continue.


Shapefile Wizard
SHP to IRX Conversion Utility - Disclaimer
This conversion utility allows a Shapefile to be converted to a single or multiple product IRX prescription file format.
It is recommended to create the prescription as an IRX file in the desktop software to reduce potential mistakes and eliminate the lengthy process of file conversion in the field.
When the conversion is complete, an IRX file will be saved to the memory card.

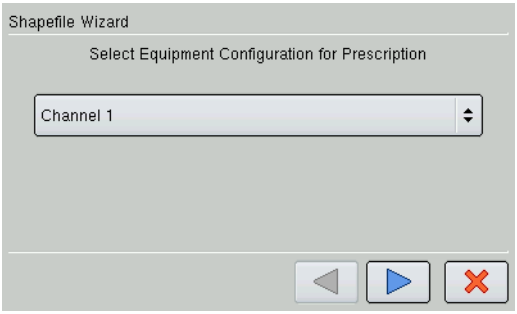
4 **Select Number and Products.** Select the number of products to be used in a variable-rate application.


Shapefile Wizard
Select the Number of Products for Variable Rate
1
TIP: Enter the number of products that require a prescription. Manually controlled products do not require a prescription and should not be included.

	Note: Enter the number of products that require a prescription. Manually-controlled products do not require a prescription and should not be included.

Shape File Conversion (continued)

5 **Select Equipment Configuration for Prescription**. Enter the channel you wish to use for the shape file conversion.



6 **Select Shape File Products and Units**. From the drop-down menu on the left, select the column that contains the product recommendation rate. The list on the right side of the dialog shows sample data from the selected column. Press the blue right-arrow button to continue.

⚠ CAUTION	*CAUTION: Selection of the wrong data column or unit will result in misapplication of product.*

7 **Default Rate Setting**. The system assigns a default rate. Use the on-screen keypad to edit the value if desired.

	Note: The only time the default rate is used by the EDGE system during product application is if the Rate Outside of Field selection is set to " Rx Default". This setting is located in the equipment configuration settings portion of configuration setup. If the Rate Outside of Field selection is set to "Rx Default", the default target rate will be used for product application when the vehicle exits a mapped field area.

8 **Name New IRX File**. If desired, rename the newly created *.irx file from the system assigned default. Press the checkmark box to complete the shape file conversion process.

Liquid Application Control

Liquid Application Control Configuration

The following procedure describes the complete process of configuring a Liquid DirectCommand control system. To begin, go to the Configuration Tab, press the Add button, and the Operating Configuration Wizard appears.

1 **Select Equipment Configuration Type**. Select either **Single Product Application** or **Dual Product Application**. Press the blue right-arrow button to continue.

Liquid Application Control Configuration (continued)

2 **Select Vehicle**. Press **New** to create a new vehicle, and select a vehicle from the drop-down list, then press the blue right-arrow button and proceed to Step 2. If your vehicle is not listed, press the **New** button and proceed to Step 1d.

- **a.** Choose Vehicle Type. The Vehicle Setup Wizard appears. Choose the correct Vehicle Type from the drop-down list and press the blue right-arrow button.
- **b.** Enter Make and Model. Use the keyboard buttons to enter in the name of your vehicle's make and model. Press the blue right-arrow button to continue.

- **c.** If you selected a Self-Propelled Sprayer, you must enter a full swath width, number of boom sections and section widths. Press the blue right-arrow button to continue.

	Notes: • *Individual boom widths must equal the total.* • *This step is skipped if you are using a Tractor, ATV, or Pickup Truck.*

- **d.** Enter a Vehicle Name. The vehicle's default name is the Make and Model you entered in step 1b. If necessary, edit that name by pressing the keyboard button and typing the preferred name. Press the checkmark box.

Liquid Application Control Configuration (continued)

3 **Select Implement**. Select the desired implement from the drop down list; then press the blue right-arrow button and proceed to step 3. If your implement is not listed, press **New** and proceed to step **2b**.

	This step does not apply if you have a self-propelled sprayer. Instead, proceed to step 4.

- **b.** Use the drop-down menu to select the correct Implement Attachment Method and press the blue right-arrow button to continue.
- **c.** Use the numeric keypad to enter the appropriate swath width and press the blue right-arrow button to continue.
- **d.** Use the up and down arrow buttons to enter in the number of boom sections. Press the blue right-arrow button to continue.
- **e.** The section numbers and swath widths of the sections are displayed in the next screen. If necessary, adjust the boom widths by pressing on the section number and use the numeric keypad to enter the actual measured width of the boom section. Repeat the process for every boom section until each is correct. Press the blue right-arrow button when complete.

	Note: Individual boom widths must equal the total.

Liquid Application Control Configuration (continued)

- **2f.** Press the numeric keypad to enter the distance from hitch to application point. When complete, press the blue right-arrow button.

	Note: The distance settings must be measured accurately for the AutoSwath™ feature to work properly.

- **g.** Enter an implement name by using the keyboard button to type in the preferred name. When complete, press the checkmark box.

4 **Select Operating Mode**. The Operating Configuration Wizard reappears, and you are asked to select an Operating Mode. Use the drop-down menu to select Rate Logging/Control and press the blue right-arrow button to continue.

Liquid Application Control Configuration (continued)

5 **Select Controller Configuration**. Select the desired DirectCommand controller configuration from the list and continue to step 5, or press **New** if the desired controller is not listed.

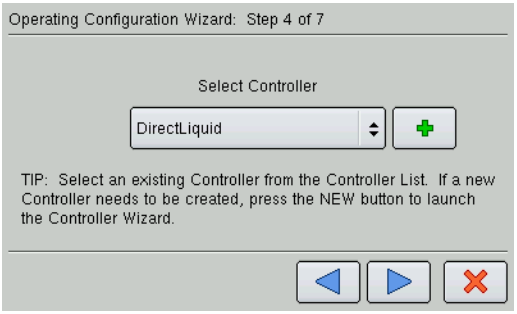
- **b.** The Controller Setup Wizard appears. Select **DirectCommand** from the drop-down list. Under the **Direct Type** list, select **Liquid Product Control**. Press the blue right-arrow button to continue.
- **c.** Enter the Flow Meter Calibration Number by using the numeric keypad to set the pulses per gallon. (This usually is tagged on the flow meter). Press the blue right-arrow button to continue.

Notes for specific flow meters:

- For more information regarding Dickey-john Flow meters or Dickey-john heat exchangers, see the Application section for Dickey-john Flow Meter Calibrations on *"Dickey John NH3 Conversions" on page 242*
- Raven flow meter tags represent pulses per 10 gallons. Divide the calibration number by 10 before entering into the display.
- Tee Jet flow meter calibration numbers represent pulses per liter. To convert the number, multiply the value found on the flow meter by 3.79 to find the pulses per gallon needed for the EDGE display.
- Mid-Tech flow meters sometimes have a cable with a module. The calibration number found on this cable is in pulses/gal divided by 16. The EDGE display should bypass this module and plug directly into the flow meter. If that is the case then multiply the calibration number by 16 before entering into the EDGE display.

Liquid Application Control Configuration (continued)

- **d.** Enter a controller name. A default name of **DirectLiquid** appears. If you would like to change this name, press the keyboard button, enter a new name and press the checkmark box.


Operating Configuration Wizard: Step 4 of 7
Select Controller
DirectLiquid
TIP: Select an existing Controller from the Controller List. If a new Controller needs to be created, press the NEW button to launch the Controller Wizard.

6 **Select Container**. The Operating Configuration Wizard reappears. Select a container from the drop-down list, or press the **New** button to create a new container.

- **a.** The Container Setup Wizard appears. Enter a container capacity and units, then press the blue right-arrow button to continue.
- **b.** Enter a container name and location. Press the checkmark box.

7 **Select Ground Speed Source**. The Operating Configuration Wizard reappears. Select a primary and backup Ground Speed Source. In most cases GPS is the primary speed source with Radar serving as backup. If you are using a backup radar speed source it is recommended that you calibrate it before the season begins. When finished, press the blue right-arrow button to continue.

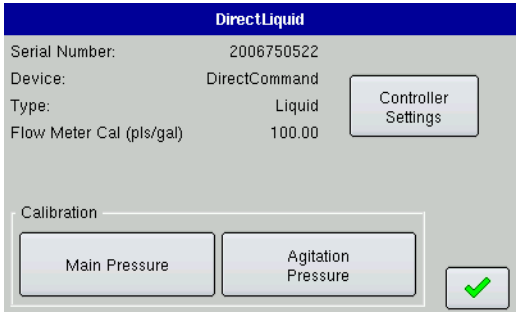
	Note: Ground Speed calibrations are completed under the Calibrate Distance button on the Application Setup Configuration screen.

Liquid Application Control Configuration (continued)

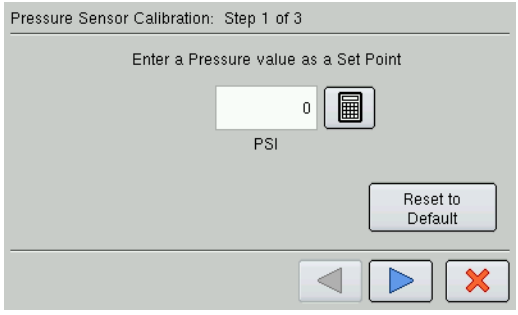
8 **Edit Configuration Name**. The Configuration name defaults to a name based on your previous configuration settings. To edit the name, press the keyboard button and type a new name.

9 **Finish Configuration**. Press the checkmark box to complete the wizard and to save the configuration into the EDGE display.

Liquid Application Controller Settings

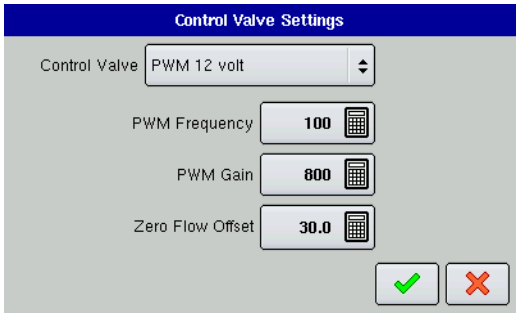


- **Controller Settings** - Displays control valve settings for PWM and Servo Valve Controls. For PWM Valve Control Settings, *See "Controller Settings - PWM" on page 269.* For Servo Valve Control Settings, *See "Controller Settings - Servo, Calibrated Reflow or Ramsey Valve" on page 270.*
- **Main Pressure** - Pressing the **Main Pressure** button summons the Pressure Sensor Calibration Wizard, as shown below. Follow the steps in the Wizard to complete the Pressure Calibration process.
- **Agitation Pressure** - Pressing the **Agitation Pressure** button summons the Pressure Sensor Calibration Wizard, as shown below. Follow the steps in the Wizard to complete the Pressure Calibration process.



Liquid Application Controller Settings (continued)

Controller Settings - PWM



- **PWM Frequency** - The frequency that the PWM control valve is pulsed at. Typical settings range from 100-125.

	Note: See PWM valve manufacturer information for recommended settings.

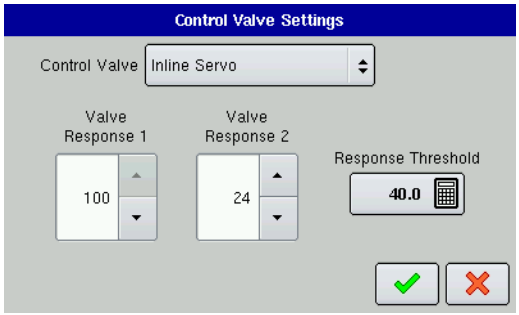
- **PWM Gain** - This setting determines how aggressively the control valve responds when making rate change adjustments. The higher the value the more aggressive the system response is.

- **Zero Flow Offset** - This setting represents the maximum duty cycle that is sent to the control valve without producing any hydraulic flow from the PWM valve. Using too high of a Zero Offset value can cause the product control system to not properly shut off.

	Note: See PWM valve manufacturer information for recommended settings.

Liquid Application Controller Settings (continued)

Controller Settings - Servo, Calibrated Reflow or Ramsey Valve



- **Valve Response 1** - Determines the speed of the servo valve when product control error exceeds the Response Threshold setting. The default for this setting is **100%**. Decreasing the value will cause the servo valve to run slower.

- **Valve Response 2** - Determines the speed of the servo valve when product control error is less than the Response Threshold setting. The default for this setting is **24%**. Decreasing the value will cause the servo valve to run slower.

- **Response Threshold** - Determines where the control system switches between using **Valve Response 1** or **Valve Response 2** speed settings. The default setting is **3**. Leaving all other valve control settings at the default value and making a small adjustment to this setting is usually all that is required to fine-tune system performance.
  - *Decreasing* this value will have the overall effect of *speeding up* servo valve response.
  - *Increasing* this value will have the overall effect of *slowing* servo valve response.

Direct Injection

DirectCommand interfaces with the Raven SCS Sidekick™ for complete control over chemical injection applications. The EDGE can support up to four Raven SCS Sidekick™ injection pumps plus a liquid carrier.

Direct Injection Configuration Setup

To set up a liquid application control Operating Configuration, first press the Setup (wrench) button and go to the Setup screen.

1. **Create Application Configuration**. Underneath the Configuration Tab, press the **Add** button to add an Application Configuration.
2. **Select Equipment Configuration Type**. Select **Dual Product Application**. Press the blue right-arrow button to continue.
3. **Select Vehicle** or **Create New Vehicle**. Select the vehicle to be used in the configuration from the drop-down list. Otherwise, press the Add button and the Vehicle Setup Wizard walks you through the steps in a vehicle configuration. These steps include entering a Full Swath Width, entering the Number of Boom Sections, and entering Boom Section Widths from Left to Right. Enter a Vehicle Name when complete.
4. **Add Equipment for Multi-Product Application**. The Add Equipment for Multiple Product Application screen appears. From here, press the Add button to add a DirectCommand Liquid Controller.

Direct Injection Configuration Setup (continued)

5 **Select Implement**.

	Note: If you are using a self-propelled sprayer, skip ahead to Step 6.

If you are not using a self-propelled sprayer, the Equipment Configuration Wizard appears. From here, you can:

- Select an Implement from the drop-down list. If you chose an already-created implement, skip ahead to Step 6.
- Press the Add button to create a new implement, and the Implement Setup Wizard walks you through the steps in an implement configuration These steps include selecting an Implement Attachment Method, entering a Full Swath Width, entering the Number of Boom Sections, entering the Boom Section Widths from Left to Right, entering the Distance from Hitch to Application Point, and entering an Implement Name.

6 **Select Controller**. Select an existing controller from the Controller List. If a new Controller needs to be created, press the New button to start the controller wizard.

7 **Select Device and Direct Type**. Use the drop-down menu to select **DirectCommand** for the **Device** and **Liquid Product Control** for the **Direct Type**. Press the blue right arrow button to continue.

8 **Enter the Flow Meter Calibration Number**. Enter the pulses/unit calibration number for the product flow meter. Press the blue right-arrow button to continue.

9 **Enter Suggested Controller Name**. A default name of **DirectLiquid** appears. Use the default name or enter a new name for the DirectCommand Liquid Configuration. Press the green check mark button to continue the configuration process.

Direct Injection Configuration Setup (continued)

10 **Select Container**. The Equipment Configuration Wizard reappears. Use the drop-down list to select an existing container, and press the blue right-arrow button to continue. Otherwise, press the **Add** button to add a container.

	Note: If you selected an existing container, skip ahead to Step 13.

11 **Enter Container Capacity and Units**. The Container Setup Wizard appears. Enter the container Capacity using the on-screen keypad. Select the Units used to represent the Capacity of the container. Press the blue right-arrow button to continue.

12 **Enter Container Name and Location**. Use the on-screen keyboard to assign a name to the Container. Press the green check mark button to complete the Container setup process and return to the Operating Configuration Wizard.

13 **Enter Suggested Name for Configuration**. Use the keyboard button to edit the suggested configuration name. Press the green check mark button and continue the procedure.

14 **Add Equipment for Dual Product Application**. The Operating Configuration Wizard reappears. Highlight your first equipment configuration and begin adding a Direct Injection configuration by pressing the **Add Injection** button, located to the left of the list.

15 **Select Injection Controller**. Press the Add button to create a new injection controller.

16 **Enter Controller Name**. The on-screen keyboard appears. Use this keyboard to enter a controller name. Press the green check mark button and return to the Equipment Configuration Wizard

17 **Select Container**. Press the Add button to enter a new container. Press the blue right-arrow button to continue.

Direct Injection Configuration Setup (continued)

18 **Enter Container Capacity and Units**. In the Container Setup Wizard, enter the container Capacity using the on-screen keypad. Use the drop-down menu underneath to select a Container Location. Select the Units used to represent the Capacity of the container. Press the blue right-arrow button to continue.

19 **Enter Container Name and Location**. Use the on-screen keyboard to assign a name to the Container. Press the green check mark button to complete the Container setup process and return to the Operating Configuration Wizard.

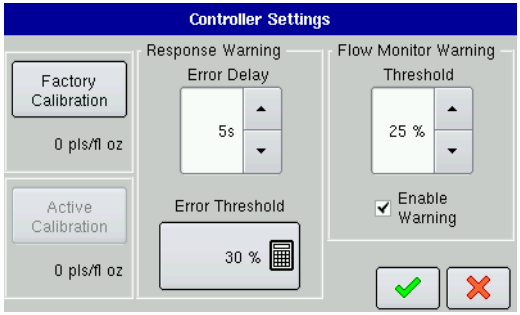
20 **Enter Suggested Name for Configuration**. If desired, use the keyboard button to edit the suggested configuration name. Press the green check mark button and continue with the procedure.

21 **Complete the configuration procedure**. At the Add Equipment for Dual Product Application screen, press the blue right-arrow button. Continue through the wizard by entering a Ground Speed Source and then entering a suggested name for your operating configuration.

Direct Injection Controller Settings

The settings contained on this controller settings screen determine Direct Injection product pump performance. To view the Direct Injection Controller Settings screen, press the Application button at the Setup screen. Go to the Application Setup Controller Tab.

At the Application Setup Controller Tab, highlight your Direct Injection module's controller in the Controller List and press the Setup (wrench) button. At the following screen, press the **Controller Settings** button. The Controller Settings screen appears, as shown below.



- **Factory Calibration** - This number is found on the tag of the Digital Pump Speed Sensor. This tag number represents pulses per 10 fluid ounces. Divide the tag number by 10 and enter this number. Once entered, this number should not be changed.
- **Active Calibration** - Press the Perform Calibration button to begin the calibration procedure for the Direct Injection pump. The pump will not run until this calibration has been performed. For more information, see *"Calibrating an Injection Pump" on page 278*.

- **Error Delay** - The number of seconds that the actual rate falls out of the error threshold before an alarm sounds.
- **Error Threshold** - The user-defined percentage of actual rate error allowed before an alarm sounds.

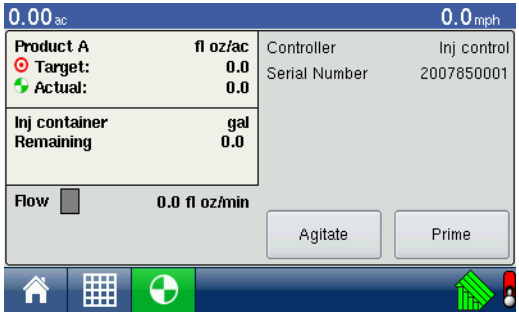
- **Flow Monitor Warning Threshold** - The percentage of perceived application error, based on the discharge flow sensor.
- **Enable Warning** - The Enable Warning check box allows you the option of displaying the Flow Monitor Warning.

Priming an Injection Pump

If you are using a Direct Injection configuration, you must prime the Injection Pump each time you flush or refill a tank, or change products. This ensures that air is not in the product lines.

⚠ CAUTION	*CAUTION: Failure to perform this priming procedure before beginning a Direct Injection application could result in skips at the start of field operations.*

1 **Press the Prime button**. To prime the Injection Pump, first go to the Rate Screen and press the Flow/Main Pressure active area on this screen, as shown below. Press the **Prime** button.



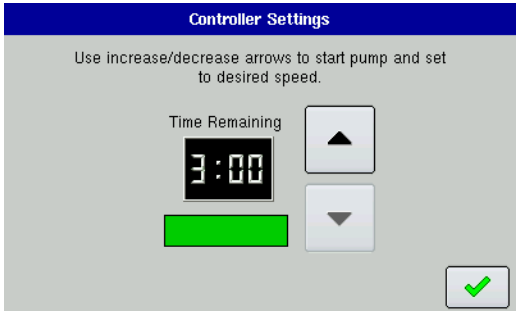
- You may agitate the Direct Injection tank by pressing the **Agitate** button. Once pressed, this Agitate setting will continue even after the Priming process is finished, until you press the green check mark button a second time. To determine if a product should be agitated, check the product specifications.
- In order for a Direct Injection tank to agitate the product, you must set the agitator motor switch on Run (which agitates the product continuously) or Pulse (which agitates the product intermittently).

Priming an Injection Pump (continued)

2 **Acknowledge the Warning**. A warning appears, stating that you must circulate the product back to the Direct Injection tank. Acknowledge the warning by pressing the green check mark button.

3 **Start Pump and Set Desired Speed.** The Injection Pump Prime screen appears. The countdown time remaining is shown in the black box. The bar underneath turns green when the pump is operating. Use the up and down arrows to manually increase or decrease the pump speed.

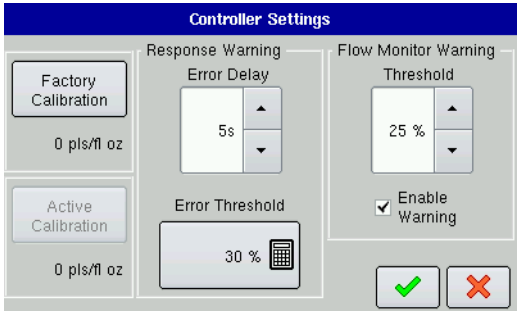
	Note: The recommended priming time is three minutes (3:00), but the routine can be ended at any time by pressing the green check mark button.



4 **Acknowledge the Warning**. A warning appears, stating that you must return chemical injection plumbing to a field-ready state. Acknowledge the warning by pressing the green check mark button.

Calibrating an Injection Pump

Direct Injection users should calibrate the Injection Pump at the beginning of each season, and any time that repairs are made. To begin, highlight your Direct Injection module's controller in the Controller List and press the Setup (wrench) button. At the following screen, press the **Controller Settings** button. The Controller Settings screen appears, as shown below.



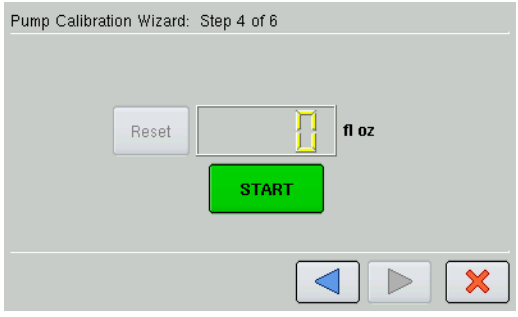
1. **Enter Factory Calibration**. Before entering a Direct Injection Calibration, a Factory Calibration must be entered. If you have not already done so, enter the Factory Calibration Number by pressing the **Factory Calibration** button. This number is found on the tag of the Digital Pump Speed Sensor. This tag number represents pulses per 10 fluid ounces. Divide the tag number by 10 and enter this number. Once entered, this number should not be changed.
2. **Press Perform Calibration**. Underneath Pump Calibration, press the **Perform Calibration** button.
3. **Prime the Direct Injection Pump**. The Pump Calibration Wizard appears. Before beginning this calibration procedure, it is recommended that you first prime the Direct Injection pump. Press the **Prime** button and continue along with the priming procedure as described in *"Priming an Injection Pump"*, beginning with Step 2 on *page 277*. After the priming procedure is finished, you will return to this Pump Calibration Wizard window. Press the blue right-arrow button to continue.
4. **Enter the Dispense Amount**. Enter the amount that you want dispensed. Press **Next** to continue.

Calibrating an Injection Pump (continued)

5 **Acknowledge the Warning**. Prepare to catch any product dispensed in an appropriate container. Press the green check mark button to continue.

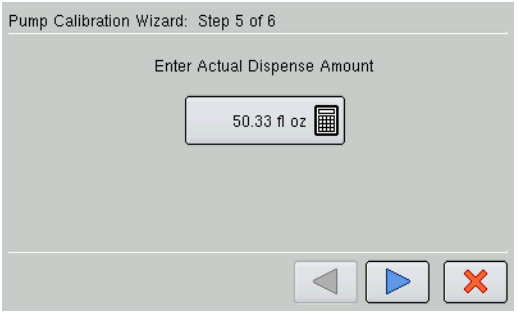
6 **Start Calibration**. Press the green-colored **START** button to begin the calibration procedure. The Pump Calibration Wizard automatically counts up to the amount that you specified in Step 4. The button will turn red and displays **STOP** while the product is being dispensed (an example is shown below). When the procedure is finished, the button will again turn green. Press the blue right-arrow button to continue.

	Note: You may press the Reset button if you wish to start the calibration procedure over.



Calibrating an Injection Pump (continued)

7 **Enter Actual Dispense Amount**. Enter in the actual amount of the product that was dispensed. Press the blue right-arrow button to continue.



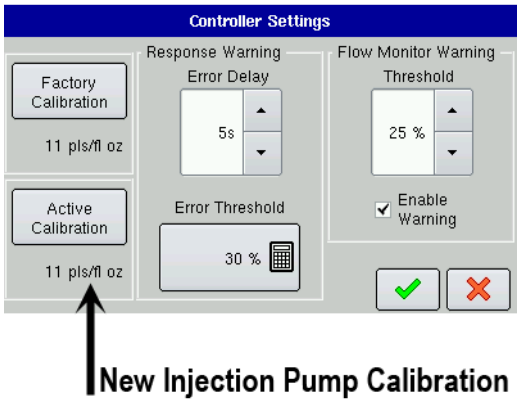
8 **Calibration Complete**. The Pump Calibration number appears. The New Injection Pump Calibration Number now appears in the Pump Calibration screen.

From this point, you may either:

- Repeat the calibration by pressing the **Repeat Calibration** button.
- Press the green check mark button to complete the calibration and exit the Pump Calibration Wizard.

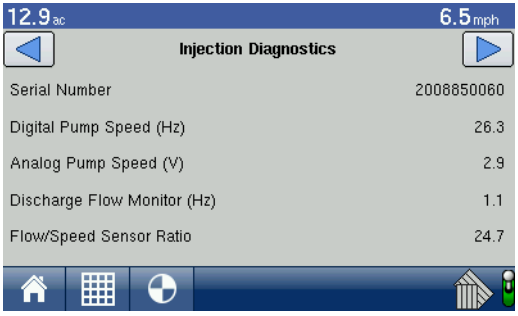
Calibrating an Injection Pump (continued)

Calibration Displayed on Controller Settings screen. The new Injection Pump Calibration Number now appears in the Pump Calibration screen, as shown below.



Injection Diagnostics

The Injection Diagnostic Tab provides raw values from sensors verifying that the pump's output is working. To go to the Injection Diagnostics screen, press the Diagnostics button, as shown at left.



- **Digital Pump Speed** - Displays volume information, shown in Hz.
- **Analog Pump Speed** - Displays varying voltage as pump speed is increased or decreased.
- **Discharge Flow Monitor** - Displays information showing that flow is being discharged for every piston stroke.
- **Flow/Speed Sensor Ratio** - The ratio that the system derived for calibration.

Spinner Spreader Granular Control

The following procedure describes the complete process of configuring a granular spinner bed control system. To begin, go to the Configuration Tab, press the **Add** button, and the Operating Configuration Wizard appears.

Spinner Spreader Control Configuration

1 **Select Equipment Configuration Type**. Select either **Single Product Application** or **Dual Product Application**. Press the blue right-arrow button to continue.

2 **Select or create a Vehicle**. Use the drop-down list to select an existing vehicle from the Vehicle list, or press **New** to launch the Vehicle Wizard to create a new vehicle.

- Self-Propelled Spreader operators should select **Self-Propelled Spreader** from the Vehicle Type list box. Select **Spinner** from the Spreader Type list box; then press the blue right-arrow button to continue.
- Other operators should select another vehicle type under the Vehicle Type list.
- If you do not need to create a new vehicle, skip ahead to Select Operating Mode in Step 4 on *page 283*.

Spinner Spreader Control Configuration (continued)

3 **Create New Vehicle**.

- If you selected **Self-Propelled Spreader**, then skip ahead to Select Operating Mode in Step 4.
- If you selected another type of vehicle, then Select **New Implement** and an Implement Attachment Method. Use the drop-down list to select an implement attachment method. Check the **Spinner Spreader Implement Type** check box; then press the blue right-arrow button to continue.

4 **Select New Implement**. Select an implement from the drop-down list menu, or press the **New** button to create a new implement.

- **b**. Select Implement Attachment Method. Use the drop-down list to select an implement attachment method. Check the. **Spinner Spreader Implement Type** check box; then press **Next** to continue.
- **c.** Enter Distance From Hitch to Application Point. Enter the distance from the hitch to the application point using the number pad button. Press the blue right-arrow button to continue.
- **d.** Enter Implement Name. Use the keyboard button to enter a name for the implement. Press **Finish** to complete the implement setup process and return to the Operating Setup Wizard.

5 **Select Operating Mode**. Select **Rate Logging/Control** from the drop-down list box as the operating mode. Press the blue right-arrow button to continue.

Spinner Spreader Control Configuration (continued)

6 **Select Controller**. If you choose to enter a new controller, the Controller Setup Wizard appears. Select **DirectCommand** from the **Select Device** drop-down list box.

Choose the appropriate **Direct Type** according to the module's part number:

- **4000396** - Spinner Spreader Control 3 CH
- **4001611** - Spinner Spreader Control 5 CH

- **b. Enter Suggested Controller Name**. The EDGE display assigns a default name of DirectSpreader to the controller. Use the on-screen keyboard to edit the name if desired. Press **Finish** to continue with the configuration process.

Spinner Spreader Control Configuration (continued)

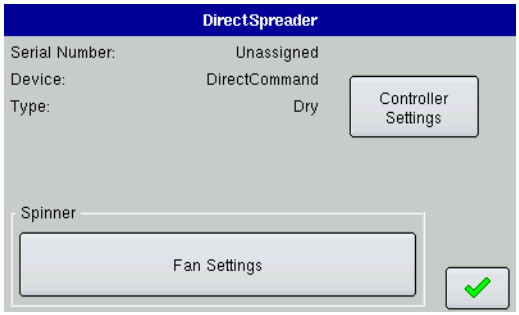
7 **Select a Container**. Select an existing container with the drop-down menu, or create a new one by pressing Add.

- **b.** Enter that container's Capacity and Units. Use the numeric keypad to enter a capacity, and the drop-down menu to enter in the type of units. Press the blue right-arrow button to continue.
- **c.** Enter Container Name and Location. Press **Finish** and you will return to the Operating Configuration Wizard.

8 **Select Ground Speed Source**. Select Primary and Backup speed inputs from the drop-down menus. Press the blue right-arrow button to continue.

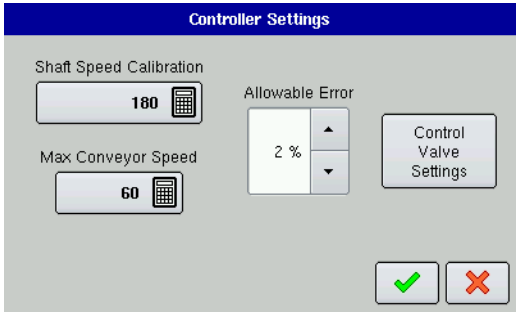
9 **Enter Suggested Configuration Name**. The EDGE system combines the Vehicle and Controller names used during the setup process to use as the Configuration name. Use the on-screen keyboard to edit name if desired. Press the checkmark box to complete the setup wizard process.

Spinner Spreader Controller Settings



- **Controller Settings** - The Controller Settings button summons the Controller Settings screen, which contains settings related to Shaft Speed Calibration, Max Conveyor Speed, and Allowable Error. For more information, *See "Controller Settings - Spinner Spreader" on page 287.*
- **Fan Settings** - For more information, *See "Fan Settings" on page 290.*

Controller Settings - Spinner Spreader



- **Shaft Speed Calibration** - Calibration number representing the pulses that equal one revolution of the rate control metering system.

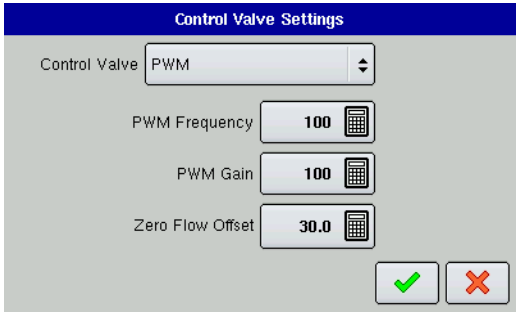
- **Max Conveyor Speed** - Setting determines the maximum RPM of the conveyor that controls product distribution to the application point.

- **Allowable Error** - Determines the percent of error that is allowed prior to the product control system making any flow rate changes. **2%** - **3%** is the normal dead band setting range.
  - Too low of a setting value can cause the product control system to continually hunt for the target application rate.
  - Too high of a setting will cause excessive product application error.

- **Control Valve Settings** - Displays control valve settings for PWM and Servo Valve Controls. For PWM Valve Control Settings, *See "Controller Settings - PWM" on page 288.* For Servo Valve Control Settings, *See "Controller Settings - Servo" on page 289.*

Controller Settings - Spinner Spreader (continued)

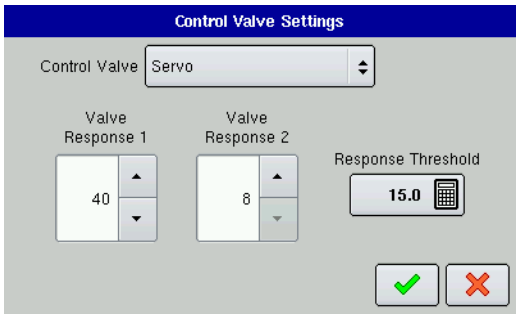
Controller Settings - PWM



- **PWM Frequency** - The frequency that the PWM control valve is pulsed at. Settings can be found from the manufacturer of the valve. Typical settings range from 100-125 Hz. The Default Setting is 100.
- **PWM Gain** - Determines how aggressively the control valve responds when making spinner speed adjustments. The higher the value the more aggressive the system response is. The Default Setting is 100.
- **Zero Flow Offset** - Represents the maximum duty cycle that is sent to the control valve without producing any hydraulic flow from the PWM valve. Using too high of a Zero RPM Offset value can cause the conveyor to not properly shut off. See the PWM valve manufacturer information for recommended settings. The Default Setting is 30.

Controller Settings - Spinner Spreader (continued)

Controller Settings - Servo



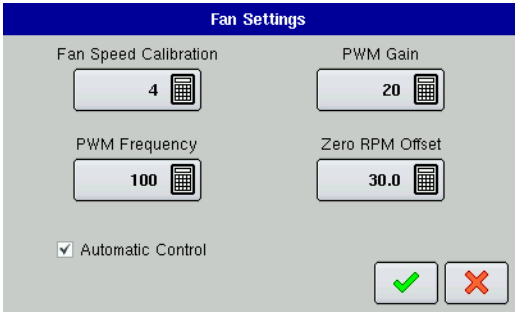
- **Valve Response 1** - Determines the speed of the servo valve when product control error exceeds the Response Threshold setting. Valve Response 1 represents the fast speed of the servo valve. Decreasing the value will cause the servo valve to run slower. The Default Setting is **40%**.

- **Valve Response 2** - Determines the speed of the servo valve when product control error is less than the Response Threshold setting. Valve Response 2 represents the slow speed of the servo valve. Decreasing the value will cause the servo valve to run slower. The Default Setting is **8%**.

- **Response Threshold** - Determines where the control channel switches between using Valve Response 1 and Valve Response 2 speed setting. Leaving all other valve control settings at the default value and making a small adjustment to this setting is usually all that is required to fine-tune system performance. The Default Setting is **15.**
  - Decreasing this value will have the overall effect of speeding up servo valve response.
  - Increasing this value will have the overall effect of slowing servo valve response.

Controller Settings - Spinner Spreader (continued)

Fan Settings



- **Fan Speed Calibration** - The number of pulses that are generated by the sensor during one revolution of the spinner dish. The Default Setting is **4.**
- **PWM Gain** - Determines how aggressively the control valve responds when making spinner speed adjustments. The higher the value the more aggressive the system response is. The Default Setting is **20**.
- **PWM Frequency** - The frequency that the PWM control valve is pulsed at. Settings can be found from the manufacturer of the valve. Typical settings range from 100-125 Hz. The Default Setting is **100**.
- **Zero RPM Offset** - Represents the maximum duty cycle that is sent to the control valve without producing any hydraulic flow from the PWM valve. Using too high of a Zero RPM Offset value can cause the spinner system to not properly shut off. The Default Setting is **30**.

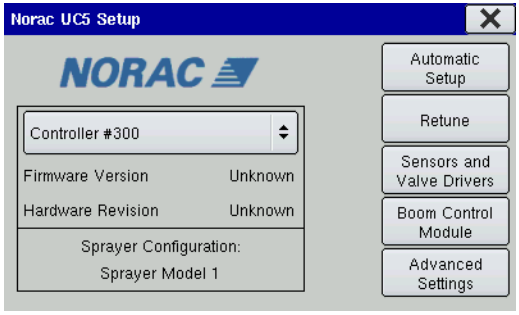
	Note: See the PWM valve manufacturer information for recommended settings.

- **Automatic Control** - Checking the **Automatic Control** check box allows you to control the spinner speed. The Default Setting is unchecked.

NORAC UC5 Setup

Norac UC5 Setup Screen

To view the NORAC UC5 Setup screen, go to the Implement Tab in Application setup, select the desired sprayer from the Implement list, check the **Enable Boom Height Control** check box and press the **NORAC UC5 Setup** button. The NORAC UC5 setup screen appears, as shown below.



NORAC UC5 Setup Screen

- **Automatic Setup** - Loads the Select Sprayer screen, which starts the Automatic Setup process. For more information, *See "Automatic Setup" on page 292.*
- **Retune** - Retunes the UC5 electronics to your sprayer's hydraulics. For more information,*See "Retune" on page 292.*
- **Sensors and Valve Drivers** - Loads the Sensor and Valve Driver Settings window, where users can set minimum height mode; adjust minimum height settings and manually edit sensor, valve and input settings. For further information, *See "Minimum Height Settings" on page 293.* Also, consult the NORAC UC5 manual for more information.
- **Advanced Settings** - NORAC non-user menu.

Automatic Setup

Automatic Setup walks through a series of steps that configures the NORAC UC5 electronics to the sprayer hydraulic functions. You must perform an Automatic Setup routine after the NORAC UC5 system is installed. The following items are configured during an Automatic Setup routine:

- Sprayer Make and Model
- Input module wiring and configuration
- Number of sensors and location
- Sensor zero point
- Valve deadzone and gain values

	Note: For detailed Automatic Setup information, see the NORAC UC5 manual.

Retune

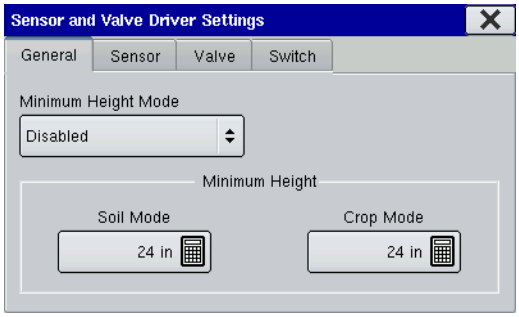
From time to time it may be necessary to recalibrate (Retune) the UC5 electronics to your sprayer's hydraulics. Examples of such times are:

- When a hydraulic solenoid valve is changed.
- When the hydraulic pump is changed or adjusted.
- When the normal working temperature of the hydraulic oil has shifted significantly from when the system was previously calibrated.

If you are running a pull type sprayer and use different tractors to operate the sprayer, you should run the Retune procedure each time the tractor is changed. If you have a flow control for the boom hydraulics, set it prior to tuning. If you change the flow setting by more than 20 percent, you should Retune.

Minimum Height Settings

Pressing the Sensors and Valve Drivers button on the NORAC UC5 window opens the Sensor and Valve Driver Settings window. The following settings appear on the General Tab.



NORAC UC5 Sensor and Valve Driver Settings

- **Minimum Height Mode** - The Minimum Height Mode drop-down menu includes three selections:
  - **Absolute** - In Absolute Mode, no sensors are allowed to move closer to the target than the minimum height setting.
  - **Relative** - In Relative Mode, no sensors are allowed to move closer to the target than the distance of the target height minus the minimum height setting.
  - **Disabled** - Disabled the minimum height mode.

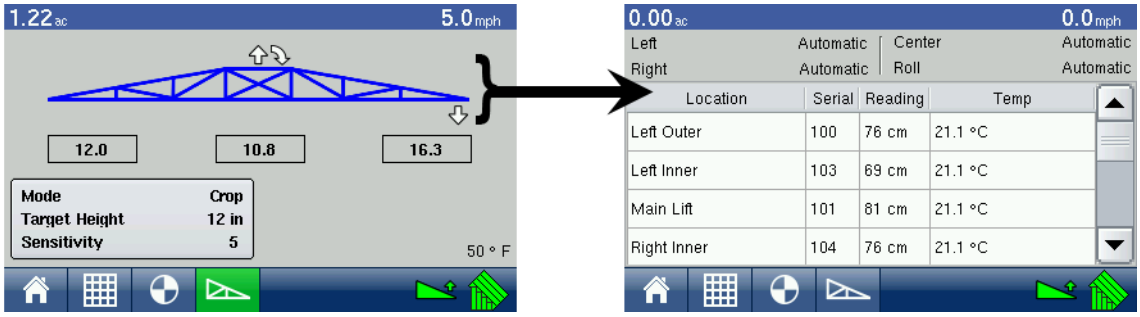
	Note: "Target" refers to the ground in Soil Mode, and the crop canopy in Crop Mode.

- Minimum Height
  - **Soil Mode** - The minimum height setting when operating in Soil Mode.
  - **Crop Mode** - The minimum height setting when operating in Crop Mode.

Norac UC5 Run Time Environment

Boom Height Screen

When the NORAC UC5 Spray Height Controller is configured on the EDGE display, the Boom Height button appears on the Task Bar. By pressing the Boom Height button, you can view the Boom Height Screen, as shown below.



Boom Height Screen (left) and NORAC UC5 Diagnostics (right)

Icon	Description
	The Boom Icon appears as blue when in Automatic Mode; and black when in Manual Mode. The right, left and center sections appear independently on this icon. Pressing the Boom Icon opens the NORAC UC5 diagnostics screen, where you can view which boom sections are in Manual or Automatic Mode, and you can also view raw values from the NORAC boom height sensors.
	The numbers that appear below the Boom Icon show the distance between the boom section and the target.
	Indicates the direction that the boom section is being commanded to move. The arrows shown around the boom appear either 1) In Automatic Mode, or 2) When the boom is in Manual Mode and the user is manually moving the boom section.

Boom Height Screen (continued)

- **Mode** - Indicates whether the Boom is in Crop Mode or Soil Mode.
- **Target Height** - The desired boom height above the ground (for Soil Mode), or the crop canopy (for Crop Mode).
- **Sensitivity** - Adjusts the boom response. Higher values make the height control more responsive.
- **Temperature** - Shows the measurement of the outside ambient air temperature.

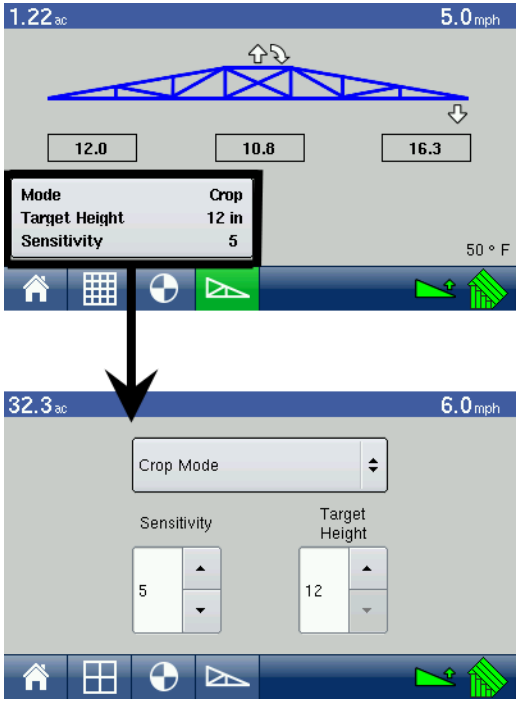
Engage button

The Engage button enables boom height control. This button can toggle back and forth between Automatic Mode and Manual Mode.

Button	Description
	When you enable Automatic Mode, this button turns green and the EDGE display beeps three times.
	When you disable Automatic Mode on any part of the boom and the display switches to Manual Mode, this button turns white and the EDGE display beeps twice. If less than the full boom remains in Manual Mode, the EDGE will continue beeping twice every three seconds.

Boom Height Control Options

You can adjust the mode, sensitivity and target height by pressing on the Boom Height Settings area at the lower left-hand portion of the Boom Height Screen, as shown in the picture below. The area of that screen opens the Boom Height Control Options screen shown at bottom.



Boom Height Screen

- **Mode** - The drop-down menu is where you can choose one of two modes:
  - In **Soil Mode**, the UC5 controls boom height relative to the distance from the soil.
  - In **Crop Mode**, the UC5 controls boom height relative to distance from the crop canopy.
- **Sensitivity** - Adjusts the boom response. Higher values make the height control more responsive; settings range from 0-10.
- **Target Height** - User-defined desired boom height in relation to the selected control mode.

Troubleshooting

Troubleshooting DirectCommand Liquid Applications

Problem	Solution
Section indicators on the Map screen of the EDGE do not turn green.	1. Make sure ground speed is registering a value greater than zero on the EDGE display. 2. Verify a target rate greater than zero is entered into the display. 3. Check the switch status found on the Diagnostics Screen, which can be accessed via the Diagnostics button on the Home Screen. As the boom switches are turned on and off, the Input Diagnostics screen should change from black to green (if they do not, then refer to the installation instructions to verify boom switch connections). 4. Check high current connection into the Liquid Control Module. 5. Make sure the implement cable PN 4000495-1 is plugged in. If plugged in, then test for 12 volts on pins A and B.
Section indicators on the Map screen of the EDGE display turn green, but the booms do not open.	1. Check wiring connections for all of the boom valves. 2. Verify that the cabling is providing 12 volts to the boom valve on the signal pin. **NOTE:** You can also check for 12 volts on pins 1-10 on the boom connection of the liquid module.
Boom valves pause up to 5 seconds before turning on by manual control.	1. Verify that the EDGE display and Liquid Control Module are both updated to the latest available firmware. 2. The boom switch cable may be wired incorrectly. For details, refer to the installation instructions. **NOTE:** This issue should only occur on John Deere sprayers. Make sure the black wires in the switch cable are connected.

Troubleshooting DirectCommand Liquid Applications (continued)

Problem	Solution
Booms will not turn on when the foot pedal is on.	Make sure the Master Switch Input is set to “External 2” under the Auxiliary Input Settings.
AutoSwath turns on the boom too fast or too slow.	1. Check GPS offsets in the vehicle setup to verify all the measurements are correct. 2. Verify that the boom offsets are appropriate for the sprayer. *Note: Boom offsets are measured from the center of the vehicle to the center of the boom section.* 3. Adjust the Turn On Look-Ahead and Turn Off Look Ahead to fine-tune Automatic Swath Control performance. 4. Verify the boom offsets are appropriate for the sprayer.
No “As Applied” rate	1. Check cabling from the channel connection of the Liquid Control Module to the flow meter. 2. Check flow meter for product buildup and proper operation.
Rate is erratic	1. Verify that the rate display smoothing option is checkmarked in the setup of the configuration. 2. Check the controller settings of the active configuration. Verify that the valve setting for your particular type of control valve agree with the settings given in the Quick Reference Guide. 3. Use manual valve control to see if the rate stays constant.
Erratic behavior from the flow meter and boom valves	Verify that the EDGE firmware and module firmware are both current.
No boom pressure at the start of the field.	Use the Manual Valve Control to build boom pressure at the start of a field.

Troubleshooting DirectCommand Liquid Applications (continued)

Problem	Solution
AutoSwath feature not shown.	The EDGE display must have the AutoSwath feature password unlocked before the feature is available to the operator.
AutoSwath checked on, but booms will not turn on.	1. Make sure the ground speed is registering a value greater than zero on the EDGE display and not in a covered area. 2. Make sure there is a target rate greater than 0. 3. Make sure the applicator is inside of the field boundary.
Booms turn on in the middle of the pass.	1. Check the EDGE firmware and module firmware to see if they are the latest version released. 2. Make sure the ground speed does not go to 0. 3. Make sure the GPS is not losing the differential source.
Rate not responding (error flashing)	1. Make sure the flow meter calibration number matches the tag on the flow meter. *Note: For Raven flow meters, divide the calibration number by 10.* 2.make sure the pump is not maxed out for the flow being applied. 3. Use manual valve control to see if the control valve will open or close. 4. Check the tip manufacturer's charts to make sure they are in the operating range of the application. 5. Check for any product buildup in the flow meter. 6. Check product filter for debris.

Troubleshooting DirectCommand Liquid Applications (continued)

Problem	Solution
Booms turn on when outside of the boundary.	1. Make sure the Rate Outside of Field is set to zero under the active configuration settings. 2. Make sure the Outside Boundary Option is set to Turn Selection Off under the Automatic Swath Control option. 3. Make sure there is not a gap between the boundary and the first pass of the headlands. *Note: For best results, run a new boundary when spraying the first pass of the headlands.*
Booms turn on for a split second in the headlands.	1. Make sure that the Turn On Look Ahead is greater than the Turn Off Look Ahead. 2. Make sure GPS Offsets are correct. 3. Make sure look aheads are less than three seconds each.

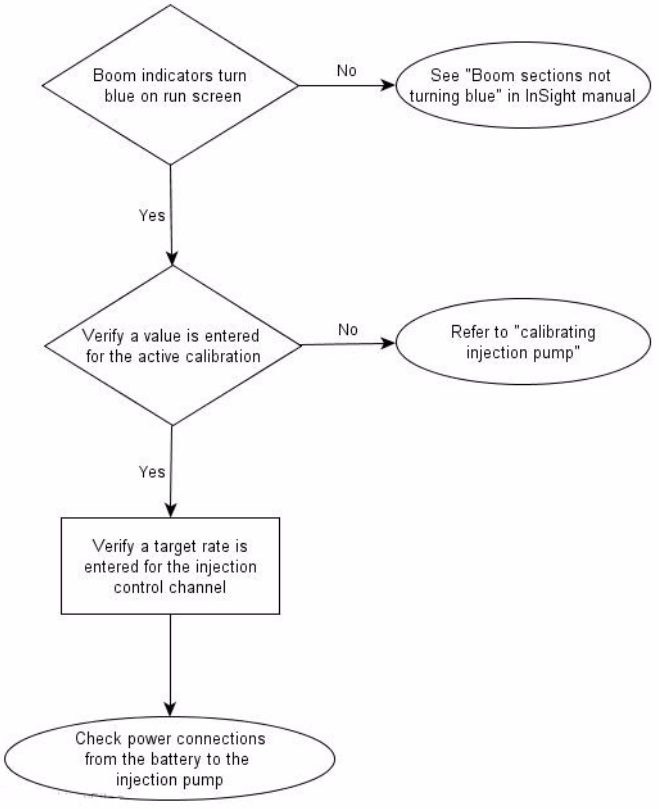
Troubleshooting Direct Injection Configurations

When controlling a chemical injection pump using the Injection Module PN: 4000896 the configuration requires the use of a Liquid Module PN: 4000394.

The injection control is based off of the vehicle that has been configured for the liquid DirectCommand control channel. Once configured, the Injection pump uses the same switch inputs and ground speed input that has been configured for the liquid system.

Direct Injection: Pump Doesn't Run

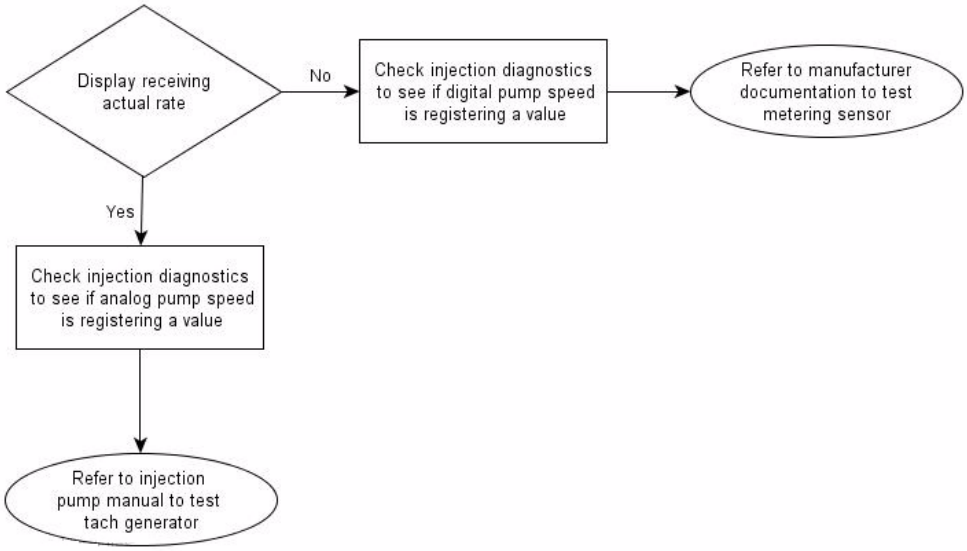
Power can be checked at multiple locations. First is the connection at the Injection module where the battery power cable plugs in. The second location is the output connection found on the injection module. The third is found at the 2 pin weather-pak tower found on the injection cable PN: 4000851-3. See table below.


Boom indicators turn blue on run screen
No
See "Boom sections not turning blue" in InSight manual
Yes
Verify a value is entered for the active calibration
No
Refer to "calibrating injection pump"
Yes
Verify a target rate is entered for the injection control channel
Check power connections from the battery to the injection pump

Battery Power Pin-Outs

	2 Pin Deutsch Plug	2 Pin Deutsch Receptacle	2 Pin WP Tower
Power 12 V	**1**	**1**	**A**
Ground	**2**	**2**	**B**

Direct Injection: Pump Runs Full Speed


Display receiving actual rate
No
Check injection diagnostics to see if digital pump speed is registering a value
Refer to manufacturer documentation to test metering sensor
Yes
Check injection diagnostics to see if analog pump speed is registering a value
Refer to injection pump manual to test tach generator

Digital Pump Speed Sensor - The injection pump's digital pump speed sensor is used to provide actual rate feedback to the display. If the display is not receiving an actual rate the pump will run full speed and provide a "Rate Not Responding" warning message. See Digital Pump Speed Pin out table below for pin locations. With the section valves on the cabling can be tested by pulsing the signal and ground pins to verify the total applied increases, it is always best to pulse the pins at least 10 times to make sure the total applied will increase by a noticeable amount.

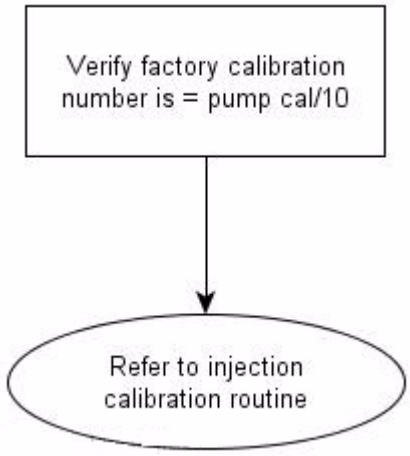
	Module Auxiliary Connection 12-Pin Socket	3-Pin Conxall
Power (5V)	**12**	**2**
Signal (5V)	**3**	**3**
Ground	**6**	**1**

Direct Injection: Pump Runs Full Speed (continued)

Analog Pump Speed Sensor – The injection pump's analog speed sensor is used in conjunction with the digital pump speed sensor to provide accurate rate feedback. The sensor is a generator that produces a varying voltage dependent on the speed of the pump. The injection module will only get feedback from this sensor when the pump is rotating. If the analog sensor is not providing a feedback to the module, the pump will run full speed and the user will not have the ability to manually change the speed.

	2-Pin WP Shroud	Varying Voltage
Signal	**A**	**>9v at max pump speed**
Ground	**B**	

Direct Injection: Application Error



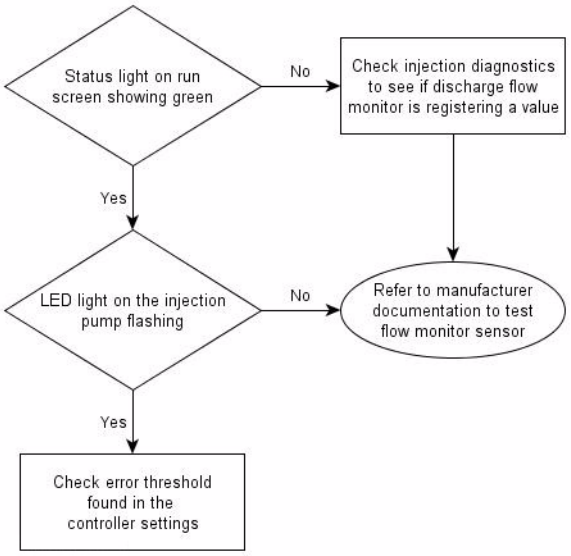
The injection module requires that a pump calibration be performed before actual application can occur. The calibration number found on the tag of the injection pump's digital speed sensor needs to be divided by a factor of 10 before entering it as the factory calibration number. If the factory cal number is entered wrong, the pump calibration routine will not finish due to a high application error.

Notes:

• The pump calibration will fail if error is >10% from the factory calibration number.

• If the calibration fails, check pump and plumbing for physical damage or excess wear.

Direct Injection: Discharge Flow Sensor Error

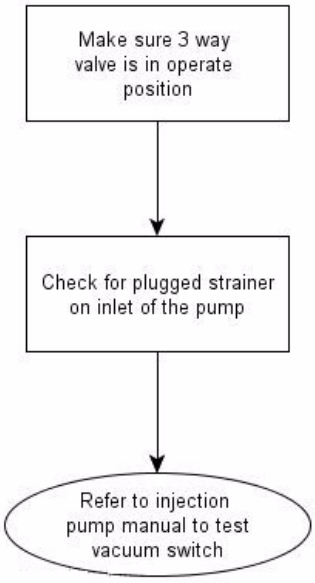

Status light on run screen showing green
No
Check injection diagnostics to see if discharge flow monitor is registering a value
Yes
LED light on the injection pump flashing
No
Refer to manufacturer documentation to test flow monitor sensor
Yes
Check error threshold found in the controller settings

The discharge flow sensor is used as a system check to see if product is actually exiting the output of the pump. The sensor is a shuttle valve that allows feedback for every stroke of the pump. If the user has enabled the Flow Monitor Warning the display will provide a message if the discharge flow sensor falls out of its calibrated value. See table below for pin locations.

Discharge Flow Sensor Pin Outs

	Module Auxiliary Connection 12-Pin Socket	3-Pin Shroud
Power (12V)	**11**	**A**
Signal	**9**	**B**
Ground	**8**	**C**

Direct Injection: Inlet Restriction


Make sure 3 way valve is in operate position
Check for plugged strainer on inlet of the pump
Refer to injection pump manual to test vacuum switch

The injection pump has a vacuum switch that is used to warn operators of any restriction at the inlet of the pump. The sensor is a normally closed switch that opens if a restriction is encountered in the injection system. A warning will be displayed for the operator if the vacuum switch opens due to restriction. See table below for pin locations. The operator can test the system by unplugging the sensor, which will trigger the warning. If the operator jumps pins A and C, the warning will end.

VACUUM SWITCH PIN OUTS

	Module Auxiliary Connection 12-Pin Socket	3-Pin WP Tower
Power (12V)	**2**	**C**
Signal	**10**	**A**

Troubleshooting DirectCommand Granular Applications

Problem	Solution
Individual implement Sections shown in the Implement Icon on the Map Zoom Detail Screen do not turn green.	1. Make sure ground speed has registered a value greater than zero on the EDGE display. 2. Verify a target rate greater than zero is entered into the display. 3. Check the switch status found under Input Diagnostics. As the master switch is turned on and off, the Input Diagnostics Screen should change from black to green (if they do not, then refer to the installation instructions to verify switch connections). 4. Check high current connection into the Granular Control Module.
Master switch will not turn on when the foot pedal is on.	Make sure the Master Switch Input is set to “External 2” under the Auxiliary Input Settings.
AutoSwath turns on the booms too fast or too slow.	Check GPS offsets in the vehicle setup to verify all of the measurements are correct.
AutoSwath feature is not shown.	The EDGE display must have the AutoSwath feature password-unlocked before the feature is available to the operator.
AutoSwath is checked on, but the spreader will not turn on.	1. Make sure the ground speed is registering a value greater than zero on the EDGE display. 2. Make sure the applicator is inside of the field boundary.
Conveyor turns off in the middle of the pass	Check the EDGE firmware and module firmware to see if they are running the latest version.
Total Applied does not match Actual Weight Applied	1. Make sure the shaft speed ps/rev are set correctly in the controller settings. 2. Make sure the controlling product is set to the correct units.

Troubleshooting DirectCommand Granular Applications (continued)

Problem	Solution
Rate not responding	1. Make sure there is a ground speed registering on the display. 2. Make sure the shaft speed pls/rev. are set correctly in the controller settings. (You must make sure to account for sprocket ratios if chain driven). $\left\{\frac{\text{Driven Teeth}}{\text{Drive Teeth}}\right\} * \text{Rate Sensor Pls} = \text{True Pls}$ 3. The CFR number may need to be adjusted.

Troubleshooting Serial Control Applications (Liquid and Granular)

Problem	Solution
Rate changes in the EDGE display, but not on the controlled console.	1. Verify that the current firmware is running on the EDGE display and Application Rate module. 2. Check the settings specific to your controlled console (For more information, refer to the Quick Reference Guide). 3. Check cabling and all connections. 4. Disconnect the serial connection and determine if the controller is functioning properly without the EDGE display.

Troubleshooting Serial Control Applications (Liquid Only)

Problem	Solution
The EDGE rate and serial-controlled rate do not match.	1. Verify the current firmware on the EDGE display and the Application Rate module. 2. Check the percent rate change. (Refer to the Quick Reference Guide for more information).

Troubleshooting Serial Control Applications (Granular Only)

Problem	Solution
The EDGE rate and serial-controlled rate do not match.	1. Verify the current firmware on the EDGE display and the Application Rate module. 2. Check to make sure the nominal rate in the EDGE display matches the nominal rate in the serial-controlled console.

Miscellaneous

Glossary of Application Settings

Configuration Settings

Setting Name	Setting Description
Rate Outside of Field	Rate that will be used outside of the field boundary. **Zero** stops product application. **Last Good** uses the previous rate before exiting the boundary. **Rx Default** uses the default rate written in the prescription file loaded.
Rate Display Smoothing	Determines how the feedback from the control channel's rate sensor will be displayed on the run screen. When checked, the system will display the target rate when the application rate is within 10% of the target rate setting. When unchecked the system will display the raw feedback from the rate sensor.
Minimum Flow	This setting is used to maintain a consistent spray pattern. The display will not allow flow to drop below the entered setting. Set to flow at the lowest operating pressure for the selected spray tips with all sections on. When spraying with one or more boom sections off, the system automatically reduces the minimum flow setting according to the reduced spray width. To adjust this setting, select the keyboard button and enter the desired numeric value.
Controller Time Delay	Compensates for any delay in the control system when changing between different product flow rates during variable rate application.

Glossary of Application Settings (continued)

Speed Input Settings

Setting Name	Setting Description
Primary Speed Source	Main speed input source used by the EDGE display.
Backup Speed Source	If the primary speed source fails, the EDGE will use the backup if one is available.
Manual Speed	If both of the speed input sources are unavailable, manual speed can be used in order for the control channel to provide application. Manual speed setting for use during static machine testing or by the control system in the absence of primary and backup speed signals.

Automatic Swath Control Settings

Setting Name	Setting Description
Turn-On Look-Ahead	Determines how far ahead the system looks to turn the swath sections back on. This setting compensates for any delay in the product control system when the sections are turned on.
Turn-Off Look-Ahead	Determines how far ahead the system looks to turn the swath sections off. This setting compensates for delay in the product control system when the boom sections are turned off.
Outside Boundary Option	Determines the behavior of the sections when exiting the field boundary or prescription-mapped area.
Coverage Option	Based on the coverage option selected, this setting determines the behavior of the swath section when entering/exiting an already applied area or field boundary. Options available include **Minimize Skip**, **Minimize Overlap**, and **User Defined Percentage**.

Glossary of Application Settings (continued)

Auxiliary Input Settings

Setting Name	Setting Description
Master Switch	Switch that performs global master control of all rate control channels.
F1-F11	Settings determine the switch(es) that will operate the controlling channel specified from the configuration setup. Single switches can be used to control multiple channels and swath sections.

Controller Settings

Setting Name	Setting Description
Flow Meter Cal	Calibration value representing the number of pulses that equal one gallon of product flow through the controlling system.
Control Valve Configuration	Setting specifies the type of control valve being used for the rate control functions of the controlling system.
Response Threshold	Determins where the control channel switches between using Valve Response 1 and Valve Response 2 speed setting.
Valve Response 1	Determines the speed of the servo valve when product control error exceeds the Response Threshold setting. Valve Response 1 represents the fast speed of the servo valve.
Valve Response 2	Determines the speed of the servo valve when product control error is less than the Response Threshold setting. Valve Response 2 represents the slow speed of the servo valve.
Allowable Error	Determines the percent of error that is allowed prior to the product control system making any flow rate changes.
Flow Control Delay	Setting for period of time from master switch on and the start of product application to the first flow control correction. This setting can be used to eliminate unwanted correction of flow control at the start of each pass. Typical setting values are zero for granular and 1-2 seconds for liquid application control.

Glossary of Application Settings (continued)

Controller Settings (continued)

Setting Name	Setting Description
Close Flow Control Valve When Rate Off	When selected the controlling system will shut down when there is either a zero rate in the field or entering an already applied area. When unchecked the controlling system will stay in the last known state when the sections are shut off.
PWM Frequency	The frequency that the PWM control valve is pulsed at. Settings can be found from the manufacturer of the valve. Typical settings range from 100-125 Hz.
PWM Gain	Determines how aggressively the control valve responds when making rate change adjustments. The higher the value the more aggressive the steering response is.
Zero Flow Offset	Represents the maximum duty cycle that is sent to the control valve without producing any hydraulic flow from the PWM valve. Using too high of a Zero Flow Offset value can cause the product control system to not properly control low rates. See the PWM valve manufacturer information for recommended settings.
Shaft Speed Cal	Calibration number representing the pulses that equal one revolution of the rate control metering system.
Max Conveyor Speed	Setting determines the maximum RPM of the conveyor that controls product distribution to the application point. This setting is used when controlling a spinner spreader applicator.

Glossary of Application Settings (continued)

Controller Settings: Direct Injection Pump Calibration

Pump Calibration Setting	Pump Calibration Setting Description
Factory Calibration	The Factory Calibration Number is found on the tag of the Digital Pump Speed Sensor. This tag number represents pulses per 10 fluid ounces. Divide the tag number by 10 and enter this number. Once entered, this number should not be changed.
Perform Calibration	Press the Perform Calibration button to begin the calibration procedure for the Direct Injection pump. The pump will not run until this calibration has been performed.
Rate Response Warning	**Rate Response Warning Description**
Error Threshold	The user-defined percentage of actual rate error allowed before an alarm sounds.
Error Delay	The number of seconds that an actual rate falls out of the error threshold before an alarm sounds.
Flow Monitor Warning	**Flow Monitor Warning Description**
Error Threshold	The percentage of perceived application error based on the discharge flow sensor.
Enable Warning	The Enable Warning check box allows you the option of displaying the Flow Monitor Warning.

Run Screen

Setting Name	Setting Description
AutoSwath	Use to enable/disable automatic control of boom section on/off state based upon field boundaries, prescription files, and previously applied areas.

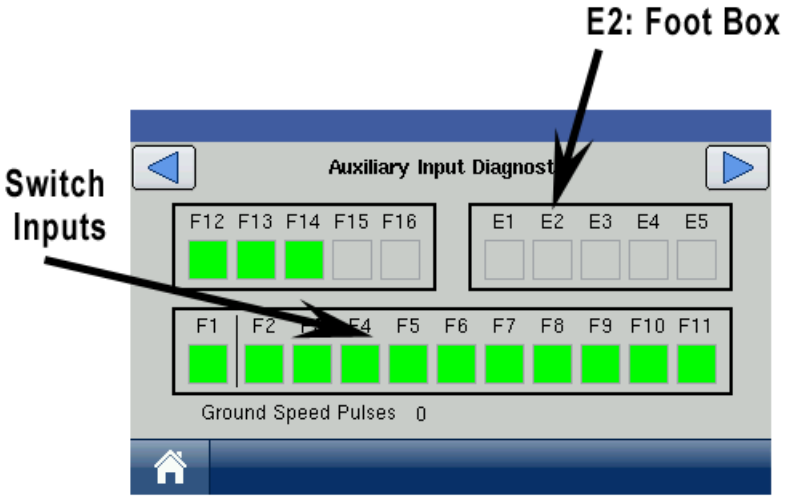
Diagnostics

Input Diagnostics

The Input Diagnostic Tab lists the number of Ground Speed Pulses coming in from the radar to the Auxiliary Module.

Additionally, the bottom row of boxes lists the active switch inputs. These color coded boxes display the following diagnostics:

- Green: The switch box is connected to the Auxiliary Module in the On position.
- Black: The switch box is connected to the Auxiliary Module, but is in the Off position.
- Grey: The switch box is not connected to the Auxiliary Module.


E2: Foot Box
Switch Inputs
Auxiliary Input Diagnost
F12 F13 F14 F15 F16
E1 E2 E3 E4 E5
F1 F2 F4 F5 F6 F7 F8 F9 F10 F11
Ground Speed Pulses 0

	Note: The E2 position is the indicator for the foot box.

	Note: Other diagnostic settings can be found in "Diagnostics" on page 45

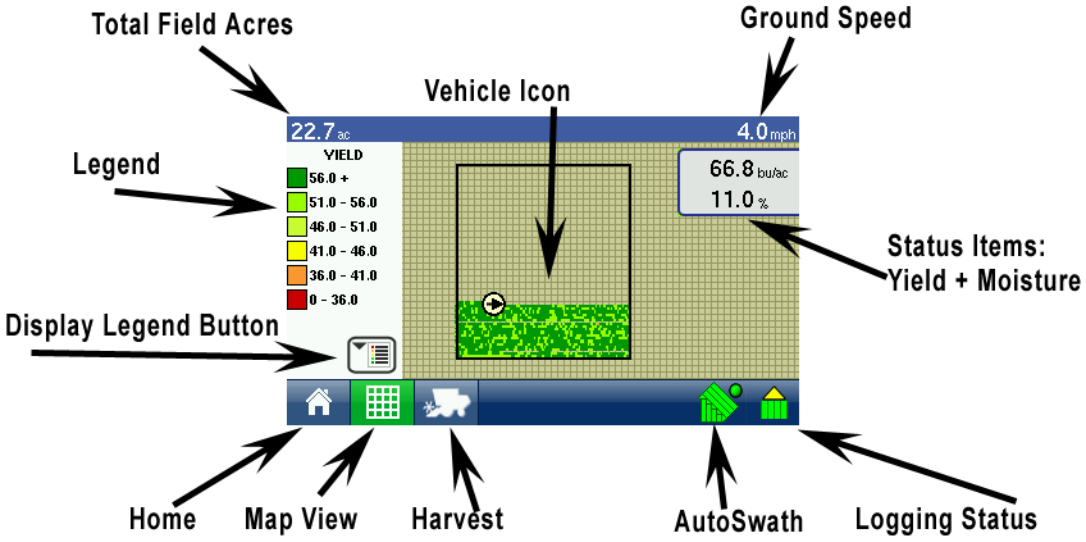
Harvest

Run Time Environment: Map Screen

The screens shown below are for a Harvest configuration. In order for you to view the Map Screen, you must first select a Grower, Farm and Field at the Start Field Operation portion of the Home Screen. For more information, *See "Management" on page 18.*

Once a configuration has been completed, the Map View button appears at the bottom of the Home Screen. Press the Map View button, and the Map Screen appears, as shown below and on the following page.

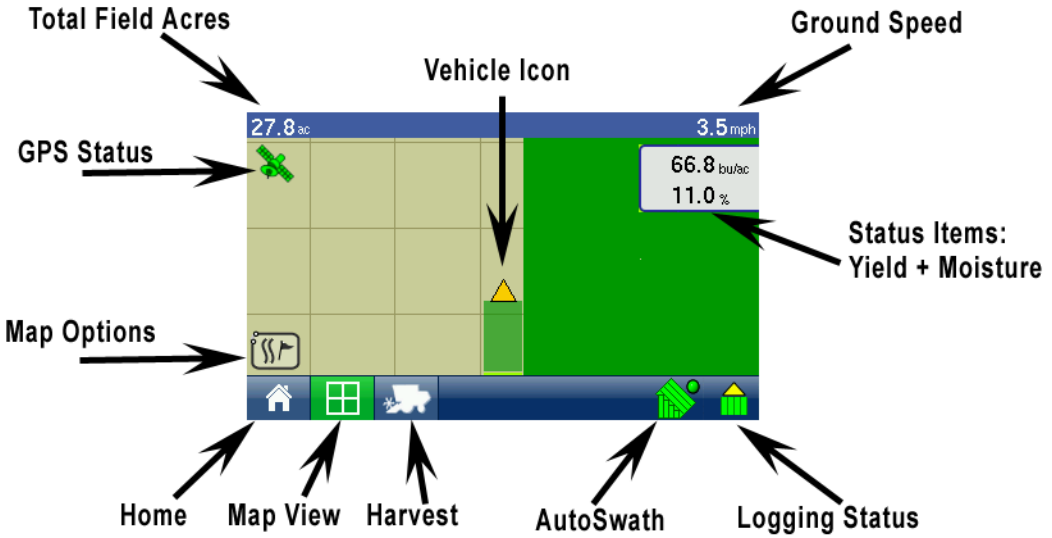
Map Screen: Zoom to Extent



	Note: Pressing the Map View button will cycle between the available Map Screen views, and the appearance of the Map View button changes.

Map Screen: Zoom Detail

When the Map Screen is shown in Zoom Detail, the Vehicle Icon appears as a gold triangle, rather than an arrow.



The following Harvest Display items are available at the Map Screen:

- **Display Legend icon**- (For example, see previous page). The Display Legend is only accessible in the Zoom to Extent view. For more information about the Display Legend, *See "Edit Legend" on page 40.*
- **Status Items: Yield and Moisture** - Current yield and moisture values are displayed in the Status Items box, located at the upper right-hand side of the Map Screen. This box displays in both Zoom to Extent and Zoom Detail views.

	Note: For information on Map Screen items that are standard for all EDGE operations, *See "Run Time Environment: Map Screen" on page 34.*

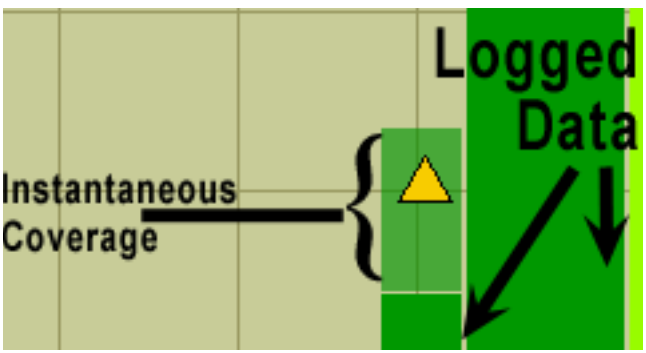
Harvest Button on Task Bar

When running a Harvest operation, the Harvest Button, which resembles a combine, appears on the Task Bar. This icon displays the Harvest Screen, where you can view more display items, swath width and diagnostics information. For more information, *See "Run Time Environment: Harvest Screen" on page 320.*

Map Screen: Flow Delay

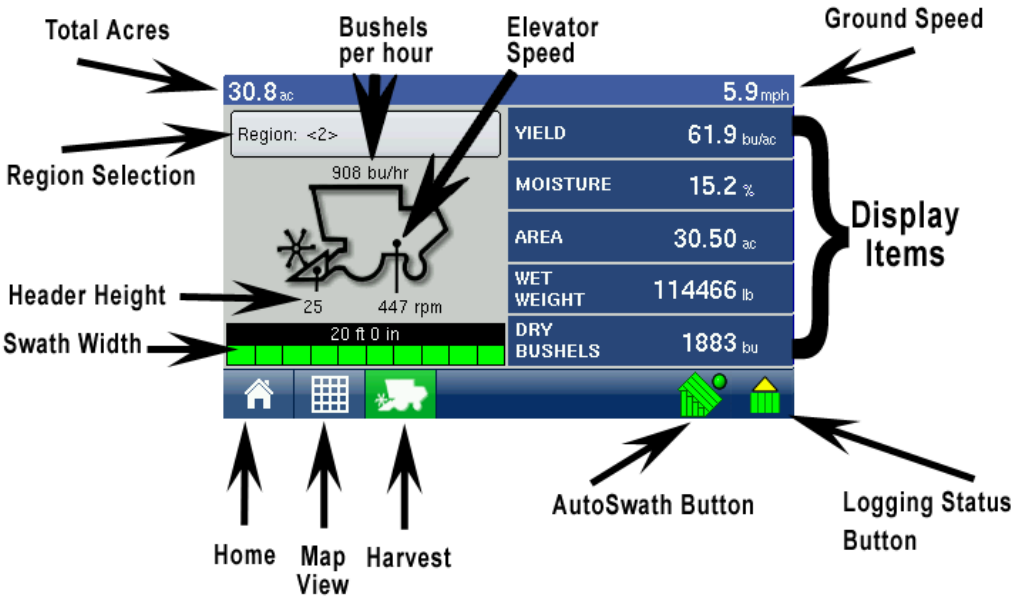
When the Map Screen is running in a Zoom Detail view, instantaneous coverage is shown automatically. However, there is a time lag between when grain enters the combine through the Header and is logged by the Flow Sensor in the Clean Grain Elevator.

Because of this time lag, the instantaneous coverage is shown on the Map Screen as a lighter color than coverage that has been logged by the EDGE display. For an example, see the picture below.



Run Time Environment: Harvest Screen

The Harvest Screen, accessible with the Harvest Button, is where you can view Region Selection, Header Height, Elevator Speed, Swath Width and Display Items.



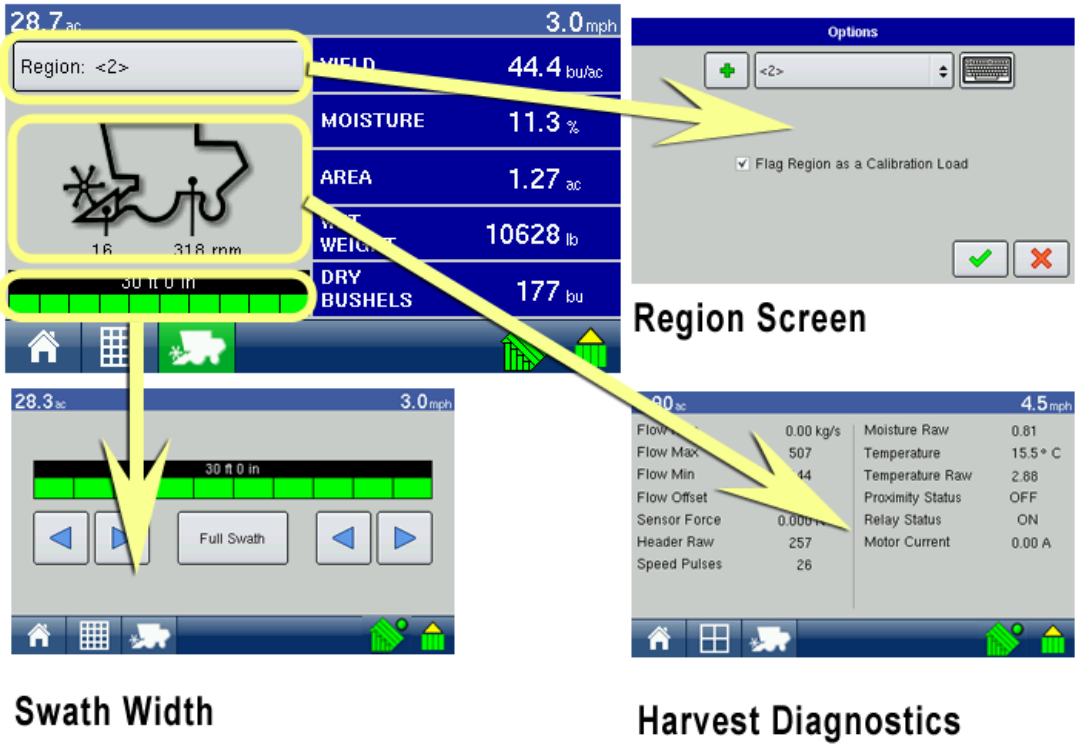
- **Region Selection** - Displays the current region that you are harvesting, and also used to change regions and flag calibration loads.
- **Bushels Per Hour** - Displays the bushels harvested per hour (bu/hr).
- **Header Height** - Displays percentage of header height.
- **Elevator Speed** - Shown in Revolutions Per Minute (RPM).
- **Swath Width** - A bar displaying the number of active sections in the swath.
- **Display Items** - For an explanation of Display Items, *See "Harvest Screen Display Items" on page 321.*

Harvest Screen Display Items

- **Yield** - Displays the instantaneous yield while there is grain flow and the average yield when grain flow is not present.
- **Moisture** - Displays the instantaneous moisture while there is grain flow and the average when there is no grain flow.
- **Area** - Shows the area harvested for the current region.
- **Wet Weight** - Shows the actual weight that has been harvested in the region.
- **Dry Bushels** - Displays the number of bushels at the specified dry moisture percentage.

Harvest Screen - Active Display Items

The Harvest Screen includes three active display items that if pressed, summon three different screens that display further harvest information.



- **Region Display Item** - Summons the Region Options screen, where you can change Regions, edit a Region Name, or flag a region as a calibration load. For more information *See "Grain Weight Calibration" on page 343.*
- **Harvest Diagnostics Display Item** - Summons the Harvest Diagnostics screen. For more information, *See "Diagnostics" on page 351.*
- **Swath Width Display Item** - Summons the Swath Width screen, where you can change the width of a swath.

	Note: The swath width cannot be manually adjusted if you are using AutoSwath.

Harvest Setup Tabs

Pressing the Harvest button at the Setup Screen takes you to the Grain Harvest **Configuration** Tab. This tab is shown in front of four other tabs: **Combine**, **Header**, **Crops** and **Calibration**.

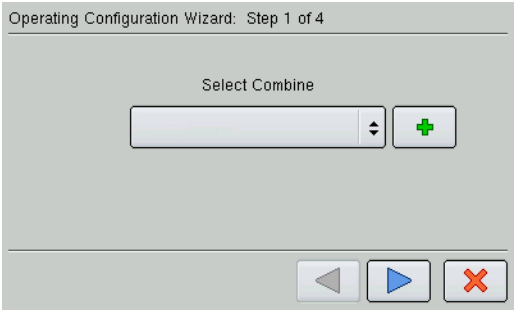
- **Configuration Tab** - The **Configuration** Tab is where you can add and edit operating configurations. For more information, *See "Create a Harvest Configuration" on page 324.* and also *See "Configuration Settings" on page 325.*
- **Combine Tab** - The **Combine** Tab is where you can set up and configure additional combines. For more information, *See "Combine Tab" on page 327.*
- **Header Tab** - The **Header** Tab is where you can set up and configure additional headers. For more information, *See "Header Tab" on page 331.*
- **Crops Tab** - The **Crops** Tab is where you can add and edit crops. For more information, *See "Crops Tab" on page 336.*
- **Calibration Tab** - The **Calibration** Tab is where you can perform calibrations. For more information, *See "Pre-Harvest Checklist" on page 339.*

Create a Harvest Configuration

To set up a Harvest configuration, you must set up a Combine and Header configuration with the following procedure.

1 At the Setup screen, press the Harvest button. The Configuration Tab opens, as shown below.

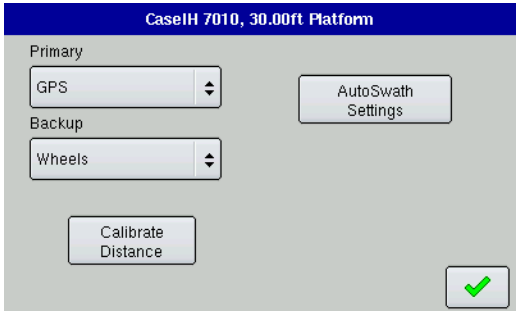
2 **Press the Add button**. The Operating Configuration Wizard appears, as shown below. From here, follow the Wizard's instructions to create a configuration that includes Combine, Header and Crops settings.



	Note: From the Configuration Tab, you can also: • *Press the on-screen keyboard to edit or rename existing configurations.* • *Press the Wrench button to access Configuration Settings (see following page).* • *Press the Remove button to remove a configuration. Caution: When deleting a configuration all harvest data logged with that configuration will be deleted.*

Configuration Settings

By highlighting a configuration and pressing the Wrench button on the Configuration Tab, you can summon the Configuration Settings screen, where you can choose primary and backup speed source, Calibrate Distance, or adjust AutoSwath settings.



Primary and Backup Speed Source

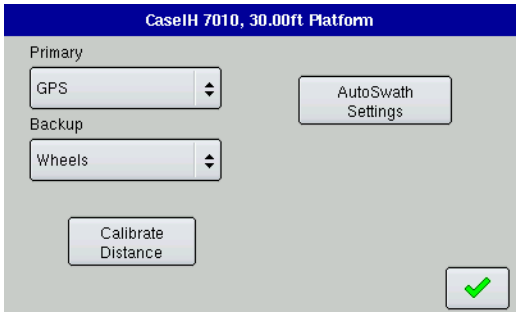
The ground speed source can be changed in the **Primary** and **Backup** drop-down menus in the Configuration Settings Screen.

- If any source other than GPS is selected, the primary speed source is the only setting that you will need to set.
- If you select GPS as the primary speed source, then you will also need to select a secondary (backup) source in case of GPS signal loss.

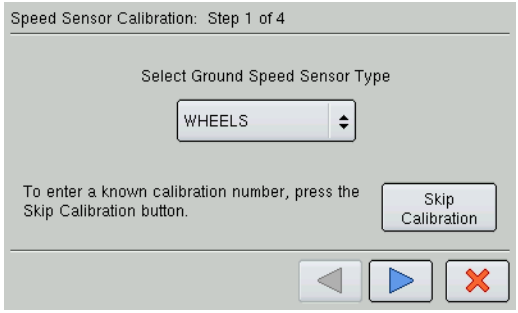
Calibrate Distance

If you are not using GPS for ground speed, then after you have created a configuration you must calibrate the ground speed input for accurate speed and area calculations. If you are using GPS, you still must calibrate distance in the event of GPS loss.

1 **Open Configuration Settings screen.** On the Configuration Tab, press on the configuration name to highlight it, then press the Wrench Button, and the Configuration Settings screen appears, as shown below.



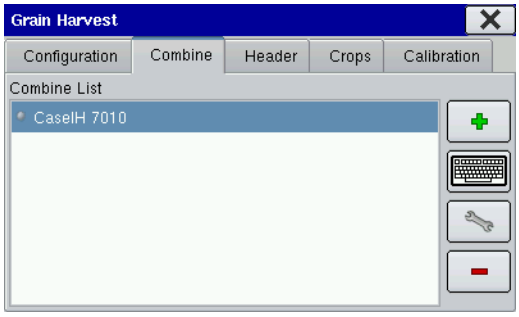
2 Press the **Calibrate Distance** button, and the Speed Sensor Calibration wizard appears, as shown below.


Speed Sensor Calibration: Step 1 of 4
Select Ground Speed Sensor Type
WHEELS
To enter a known calibration number, press the Skip Calibration button.
Skip Calibration

3 From here, follow the on-screen wizard's instructions to complete the distance calibration procedure.

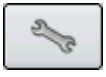
Combine Tab

Underneath the Combine Tab, you can view, add, rename or remove combines, or adjust combine settings.

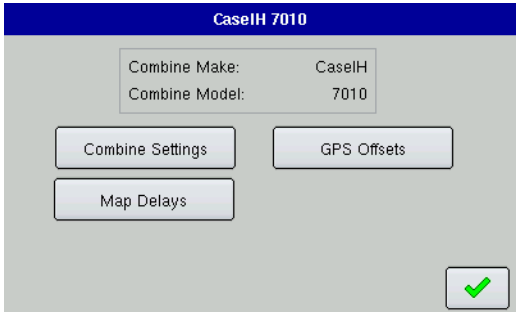


- Press the Add button to add a configuration.
- Press the on-screen keyboard to edit or rename existing combines.
- Press the Wrench button to access Combine Settings (see below).
- Press the Minus button to remove a configuration. (**Note:** When deleting a combine all harvest data logged with the configuration will be deleted).

Combine Settings



By highlighting the configuration and pressing the Wrench button on the Combine Tab, you can summon the Combine Settings screen, where you can access **Combine Settings**, **Map Delays**, or adjust **GPS Offsets**.



Advanced Combine Settings

The **Combine Settings** button allows you to change the advanced settings for the selected combine. The values should not be changed unless instructed to do so by Ag Leader Technical Support.

⚠CAUTION	*Note: Do not change any of the advanced combine settings without specific instruction from Ag Leader Technical Support!*

Map Delays

Press to change the Map Delay settings.

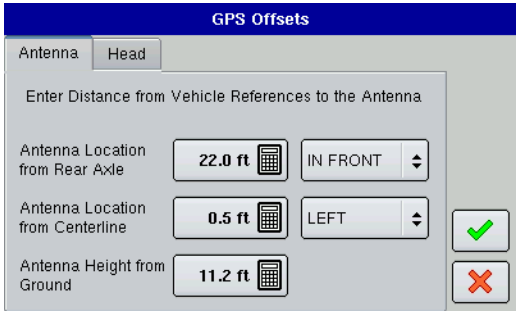
⚠CAUTION	*Note: Do not change settings from the default value of 4 without specific instruction from Ag Leader Technical Support!*

GPS Offsets

After completing the process of setting up a Combine, GPS Offsets must be configured. The GPS Offsets define where machine parameters are in relation to the GPS antenna. These settings are used by mapping and AutoSwath.

Antenna Offsets

The Antenna Tab contains three different settings. Accuracy when measuring for a specific setting is essential to ensure proper machine performance.

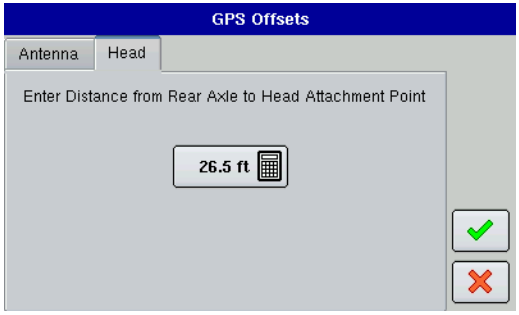


- Measure and enter the horizontal distance from the rear axle to the position of the GPS antenna. Select **In Front** or **Behind** from the list box to indicate the position of the antenna in relation to the rear axle.
- Measure and enter the horizontal distance from the centerline of the vehicle to the position of the GPS antenna. Select **Left** or **Right** to indicate the position from the vehicle centerline.
- Measure and enter the vertical height of the antenna above the ground.

GPS Offsets (continued)

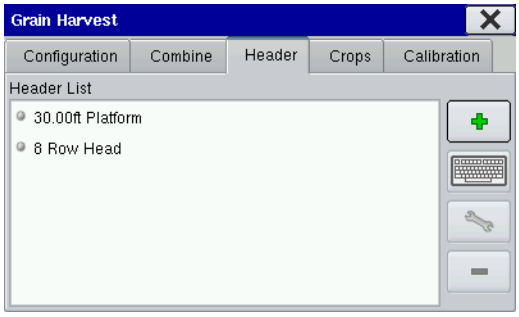
Head Offset

The Head Tab allows you to enter in the distance from the head attachment point to the rear axle. Use the numeric keypad to enter in the distance to the axle.



Header Tab

Underneath the Header Tab, you can view, add, rename or remove headers, or adjust header settings.

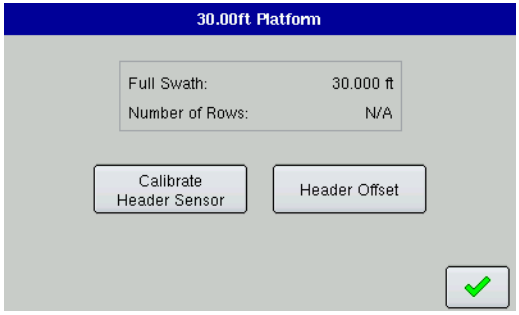


- Press the Add button to add a header.
- Press the on-screen keyboard to edit or rename existing headers.
- Press the Wrench button to access Header Settings. For more information, *See "Header Settings" on page 332.*
- Press the Remove button to remove a header.

	Note: When a header is removed, all data in the regions and configurations using that header are deleted.

Header Settings

Under the Header Tab, highlight the header name, press the Wrench button and go to the Header Settings screen. At the Header Settings screen, you can view the swath width and/or the number of rows on the header, as well as calibrate the Header Sensor and adjust the Header Offset.



- **Calibrate Header Sensor** - The Calibrate Header Sensor button launches the Header Sensor Calibration wizard, which will walk you through calibrating the header sensor that turns area logging on and off. For more information, *See "Calibrate Header Sensor" on page 333.*

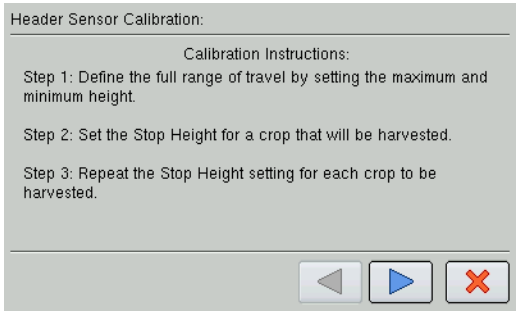
- **Header Offset** - The Header Offset button allows you to compensate for the distance between the GPS antenna (located in the center of the vehicle), and the center of the header's swath. For more information, *See "Header Offset" on page 335.*

Calibrate Header Sensor

Prior to logging harvest data, you must calibrate the header sensor. To do this, first press the Header Tab, select the correct header from the Header List and press **Calibrate Header Sensor**.

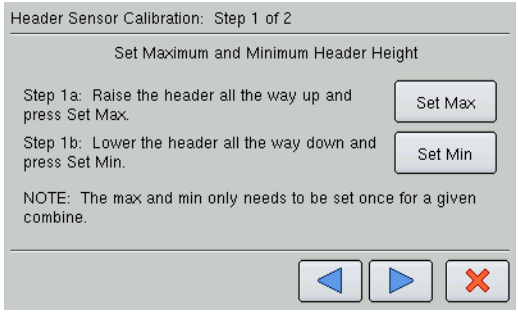
	Note: To calibrate a header sensor, you must have first a crop defined. For more information, see *"Crops Tab" on page 336*

1 **Read Instructions**. Read the header sensor calibration instructions fully before proceeding. Press the blue right-arrow button to start the calibration process.


Header Sensor Calibration:
Calibration Instructions:
Step 1: Define the full range of travel by setting the maximum and minimum height.
Step 2: Set the Stop Height for a crop that will be harvested.
Step 3: Repeat the Stop Height setting for each crop to be harvested.

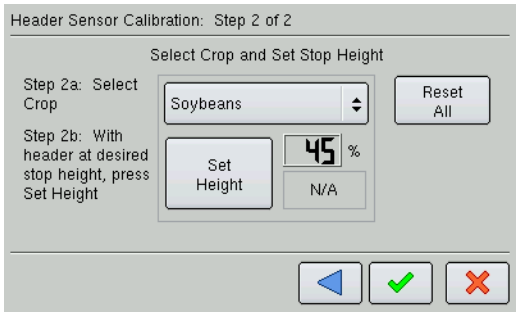
2 **Set Max and Min**. Set maximum and minimum header height settings.

- Raise the header all of the way up and press **Set Max**.
- Lower the header all of the way down and press **Set Min**. This determines the full operating range of the header.
- Press the blue right-arrow button to continue.


Header Sensor Calibration: Step 1 of 2
Set Maximum and Minimum Header Height
Step 1a: Raise the header all the way up and press Set Max.
Set Max
Step 1b: Lower the header all the way down and press Set Min.
Set Min
NOTE: The max and min only needs to be set once for a given combine.

Calibrate Header Sensor (continued)

3 Set Stop Height. Select the correct crop type from the list box. Raise or lower the header to the height where you would like to have the area logging turn on and off. Press **Set Height**.



	Note: The position relating to the Stop Height will be represented as a percentage.

- Move the header above and below the Stop Height. When below the Stop Height the dialog will indicate Down, when above the Stop Height the dialog will indicate Up.

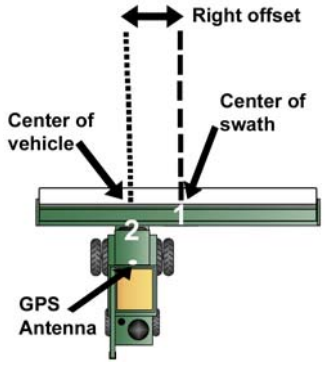
- To clear Min, Max, and Stop Height for all headers, press **Reset All**.

⚠CAUTION	*Note: If Reset All is pressed the sensor will have to be calibrated for all headers!*

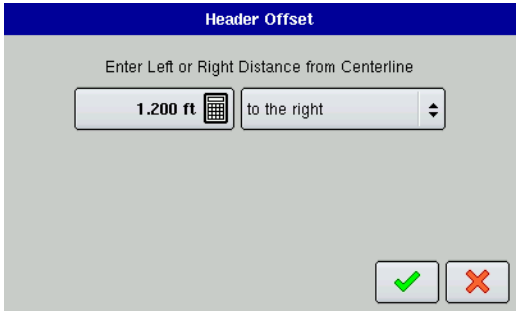
Header Offset

If the header of your vehicle is mounted asymmetrically to the vehicle's center, this can affect the accuracy of the GPS data you are receiving. With the Header Offset feature, you can compensate for the distance between the center of the vehicle and the center of the header's swath.

1 **Measure Distance.** First, measure the distance between the GPS antenna and the center of the header's swath.



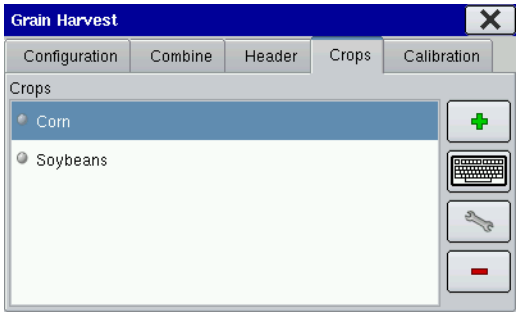
2 **Pull up the Header Offset screen.** Under the Header Tab, highlight the header name, press the Wrench button and go to the Header Settings screen. Press the **Header Offset** button and the Header Offset screen appears, as shown below.



3 **Enter the Distance Amount**. Enter the distance amount by using the Calculator button, and the distance from the centerline with the drop-down menu on the right. When finished, press the checkmark button.

Crops Tab

Crops are added and edited on the Crops Tab. The crops list shows all the crops that have been created and are available for use.



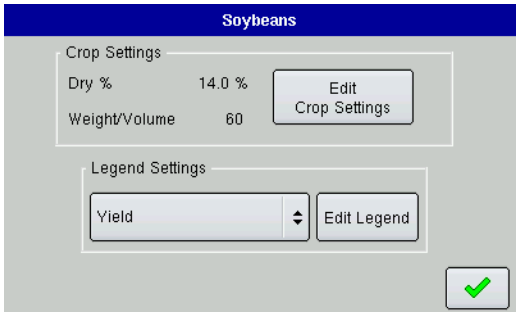
- Press the Add button to add a crop.
- Press the on-screen keyboard to edit or rename existing crops.
- Press the Wrench button to access Crop Settings. For more information, *See "Crop Settings" on page 337.*
- Press the Remove button to remove a crop.

	Note: When a crop or variety is removed, all logged harvest data relating to that crop or variety will be deleted.

Crops Tab (continued)

Crop Settings

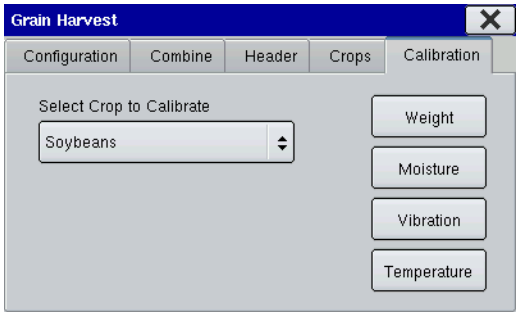
The Crop Settings screen displays the **Dry %** and the **Weight/Volume** for the selected crop. Here you can edit Crop Settings and edit the map legend.



- **Edit Crop Settings** - The **Edit Crop Settings** button allows you to edit Grain Settings values from the default, such as **Dry %** and the **Weight/Volume** settings. Press the checkmark box to expand the number of bushels for grains below the dry percentage.
- **Legend Settings** - choose **Yield** or **Moisture**.
- **Edit Legend** - Press the **Edit Legend** button to change the default legend for the selected crop type. The Legend Settings that are made here will affect new fields of that crop type. For additional information *See "Edit Legend" on page 40.*

Calibration Tab

The Calibration Tab is where you may perform **Weight**, **Moisture**, **Vibration** and **Temperature** calibrations.



- **Weight** - The **Weight** button allows you to enter actual Weight Calibration loads into the EDGE display for each grain type. For more information, *See "Grain Weight Calibration" on page 343.*
- **Moisture** - The **Moisture** button allows you to calibrate the moisture for the selected crop type. For more information, *See "Moisture Calibration" on page 342.*
- **Vibration** - The **Vibration** calibration helps eliminate any false grain flow readings while the combine is running empty. For more information, *See "Vibration Calibration" on page 340.*
- **Temperature** - The **Temperature** button allows you to calibrate the grain temperature. For more information, *See "Temperature Calibration" on page 341.*

Pre-Harvest Checklist

Calibration Sequence

Perform Harvest Calibrations in the following order:

1 Distance (Speed Sensor) Calibration

This calibrates the Ground Speed Sensor connected to the EDGE display. (EDGE users using GPS speed as the primary speed sensor must still calibrate a backup sensor). For more information, *See "Calibrate Distance" on page 326.*

2 Calibrate Header Sensor

This sets the height when the EDGE display stops recording area as the header is raised at the end of the pass. Stop height calibration is required for each grain type. For more information, *See "Calibrate Header Sensor" on page 333.*

3 Perform a Vibration Calibration

The vibration calibration is used to compensate for the amount of force that is measured by the flow sensor with no grain flow. For more information, *See "Vibration Calibration" on page 340.*

4 Calibrate Temperature

This sets the temperature offset to provide a correct moisture reading. For more information, *See "Temperature Calibration" on page 341.*

5 Calibrate Moisture

This sets the moisture offset to help provide accurate moisture and yield readings. For more information, *See "Moisture Calibration" on page 342.*

6 Calibrate Grain Weight

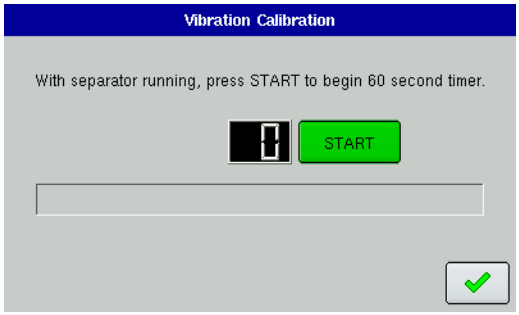
A correct Grain Weight Calibration provides accurate readings across all grain flow ranges. Calibration is required each year and for each grain type. For more information, *See "Grain Weight Calibration" on page 343.*

Vibration Calibration

The vibration calibration must be performed with the correct head on the combine, and repeated for each crop harvested.

1 **Run Separator.** Start the separator and feeder house with the proper header attached. Run at full speed.

2 **Press Vibration.** At the Calibration Tab, use the drop-down menu to select the crop to calibrate. Press the **Vibration** button, and the Vibration Calibration screen appears.



3 **Press Start**. With the combine separator running at full operating speed with the header engaged, press the **Start** button. The display counts down 60 seconds.

4 **Calibration Number Displayed**. When the vibration calibration is complete, the vibration calibration number is displayed, and a message appears stating “Calibration Complete.” Press the checkmark box to return to the Calibration Tab. You may now turn off the separator.

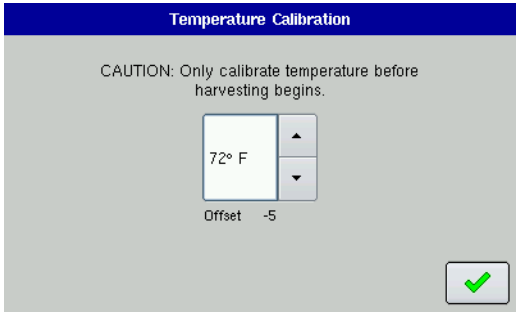
Temperature Calibration

A Temperature Calibration only needs to be performed once per season. Changing this calibration will affect previously harvested data.

1 **Place Combine in Shady Spot**. Leave the combine parked in a shaded area or a shed for a few hours. The temperature calibration should not be performed if the sensor has been in direct sunlight or is sitting next to grain.

2 **Take Air Temperature Reading**. Take an accurate air temperature reading using a thermometer in the same shaded area.

3 **Press Temperature Button on Calibration Tab**. On the EDGE display, go to the Calibration Tab and press the **Temperature** button. The Temperature Calibration screen appears, as shown below.



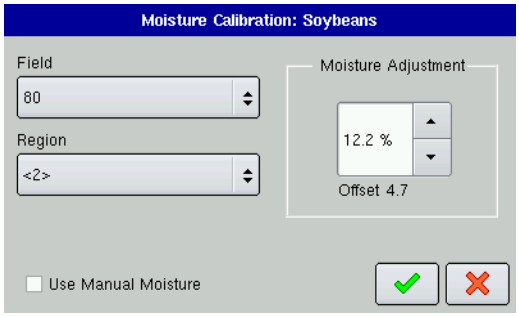
4 **Enter Outside Air Temperature**. Use the up and down arrow keys to enter the known outside air temperature. As you press the keys, the Offset number changes to reflect the new temperature calibration. Press the checkmark box when complete.

Moisture Calibration

A moisture calibration only needs to be done once per crop per season. Changing this calibration will affect previously-harvested data.

1 **Measure Moisture on Grain Samples.** Harvest one load of grain. Randomly sample grain from several locations in the grain tank to collect an average moisture for this load, then measure the actual moisture using an accurate moisture tester.

2 **Press Moisture Button on Calibration Tab**. On the EDGE display, go to the Calibration Tab. Use the drop-down menu to select the crop to calibrate. Next, press the **Moisture** button. The Moisture Calibration screen appears, as shown below.



3 **Choose Field, Region, and Adjust Moisture**. Choose the correct field and region the moisture sample was taken from. Use the up and down arrow keys to adjust the moisture so that it matches the known moisture of the sample. When finished, press the checkmark box.

	Note: To use one constant moisture, select the Use Manual Moisture check box and use the arrow keys to adjust to the desired percentage.

Grain Weight Calibration

Before the EDGE display can accurately measure harvested bushels, you must calibrate the display by entering in actual load weights into the EDGE display for each grain type. You must obtain these actual load weights by weighing the grain from a load on accurate scales. To obtain accurate results, you must obtain between four and six calibration loads. You can complete a weight calibration at any time during the season; however it is recommended that you calibrate grain weight at the beginning of the season.

	Note: Start the calibration procedure with the combine stopped, the combine grain tank empty, and a hauling vehicle empty.

1 **Open Region Options Screen**. While performing a Harvest Operation, press the Harvest Button, and the Harvest Screen appears. Press the Region Display Item, and the Region Options screen appears, as shown below. (For an illustration of this, *See "Harvest Screen Display Items" on page 321.*)

2 **Flag Region as Calibration Load**. Press the **Flag Region as Calibration Load** check box; then press the checkmark box to return to the Harvest Screen.

3 **Choose Speed or Swath Width**. Decide the speed at which you will drive or the swath width you will use for this load. Try to keep your speed or swath width as constant as possible for the entire load.

Grain Weight Calibration (continued)

4 **Harvest Calibration Load**. Harvest a load weighing between 3,000 and 6,000 pounds (1,361 to 2,721 kilograms).

5 **Empty Grain and Weigh Load**. Empty the grain tank completely onto a truck or wagon, and weigh it with an accurate scale. Record each individual load weight to be entered into the EDGE display. (No grain from any other combine should be unloaded into this hauling vehicle).

6 **Change Loads**. In the EDGE display, immediately change to another load that does not have any data.

7 **Weigh and Record Load Weight**. Weigh the grain on the hauling vehicle and record the actual load weight.

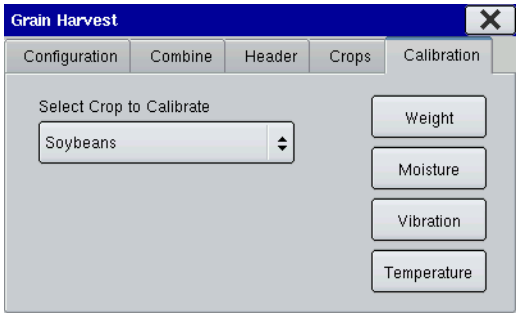
- If you are using a weigh wagon to weigh the grain, make sure the wagon has been calibrated properly.
- Only use one scale during this calibration process.
- Use the same vehicle for all calibration loads.
- Do not use a semi truck, as this vehicle's capacity is too large for a calibration load.

8 **Repeat for Four Calibration Loads**. Repeat steps 1-7 for a minimum of four calibration loads. These calibration loads should be uniform in size.

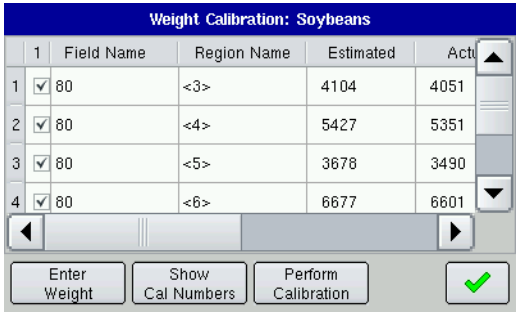
- Harvest each of these loads at a different grain flow rate. Grain flow can be altered by changing the ground speed for each load (the recommended method) or using different swath widths for each load.
- As you enter these calibration loads, name them by using the appropriate region names, (for example name Region 1 = 5.0 mph, Region 2 = 4.5 mph, etc). This will eliminate confusion when identifying calibration loads.

Grain Weight Calibration (continued)

9 Select Crop to Calibrate. Press the Grain Harvest button and then go to the Calibration Tab, as shown below. Use the drop-down menu to select the crop to calibrate.



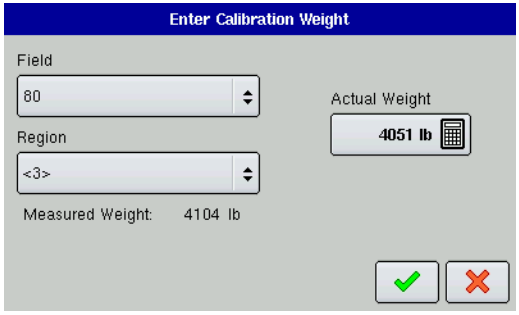
10 Press Weight Button. Press the **Weight** button, and the Weight Calibration Screen appears, as shown below.



11 Press Enter Weight. By default, all Field Names are checked. Uncheck any regions that you do not wish to include in the weight calibration, and press the **Enter Weight** button.

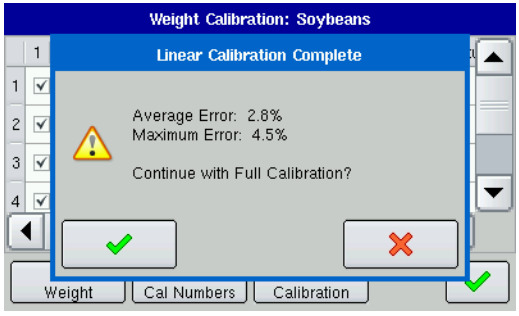
Grain Weight Calibration (continued)

12 **Select Region and Enter Actual Weight**. The Enter Cal Weight screen appears, as shown below. Select the Region and use the numeric keypad to enter the Actual Weight for those regions. Repeat this step for each calibration load. When finished, press the checkmark button.



13 **Press Perform Calibration.** When the Weight Calibration Screen reappears, press the Perform Calibration button.

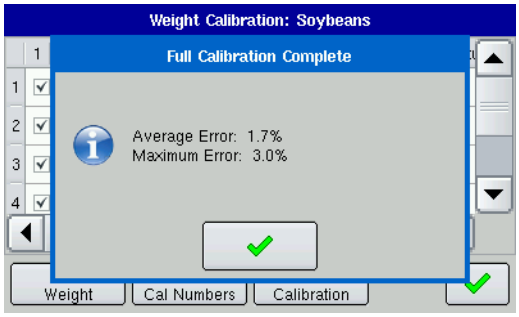
14 (Optional Step) **Continue with Full Calibration.** A message appears, stating “Linear Calibration Complete”, as in the example shown below. From here, you can continue with a Full Calibration, which is more accurate than the Linear Calibration that you just performed.



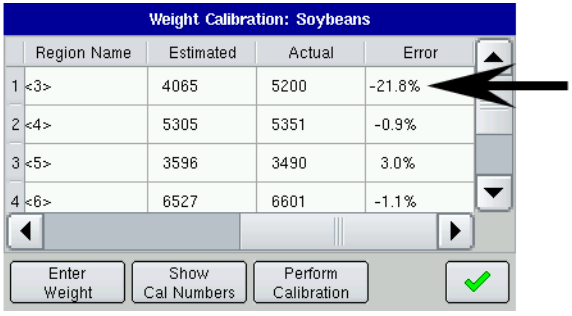
	Note: A full calibration requires four or more loads; as compared to the Linear Calibration that you just performed, which can be performed with three loads or less.

Grain Weight Calibration (continued)

15 Examine Error Percentage. When the calibration is finished, a screen appears, stating "Full Calibration Complete." Examine the error percentages before checking the check mark box.



16 Uncheck Loads With Excessive Error Percentages. At the Weight Calibration Screen, take note of any calibration loads that have excessive error percentages. In the example below, Region 3 has an error percentage of 21.8 percent.



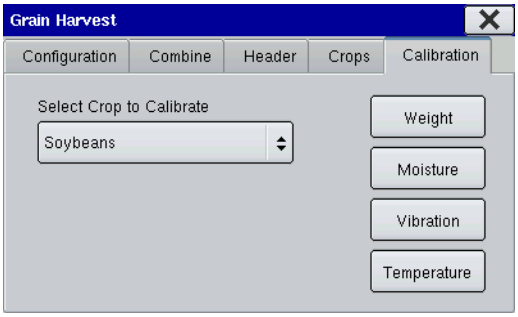
You should be able to calibrate the EDGE display for grain weight to an average error of **1%** to **3%**. If the average error is more than **3%**, uncheck the load with the maximum error. Then re-perform the calibration by pressing the **Perform Calibration** button.

	Note: You must still have at least four calibration loads checked in order to perform a full calibration.

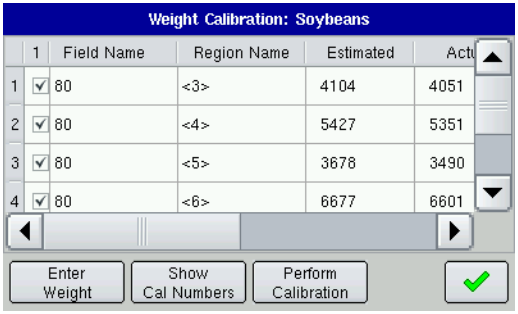
Adding a New Calibration

If you notice a decreased yield accuracy, you may need to perform a new calibration. To do this, use the following procedure.

1 **Select Crop to Calibrate**. Press the Grain Harvest button and then go to the Calibration Tab, as shown below. Use the drop-down menu to select the crop to calibrate.

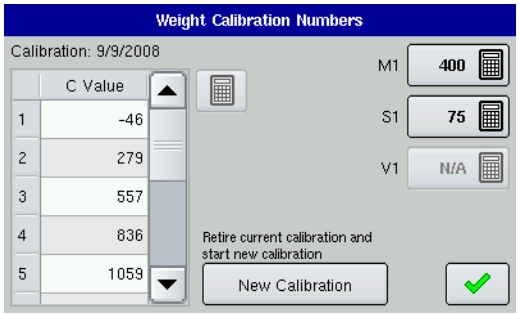


2 **Press Weight Button**. At the Calibration Tab, press the **Weight** button, and the Weight Calibration Screen appears, as shown below.



Adding a New Calibration (continued)

3 **Press Show Cal Numbers**. Press the **Show Cal Numbers** button, and the Weight Calibration Numbers Screen appears, as shown below.

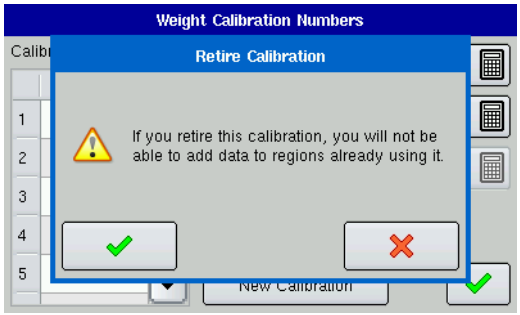


- On the left-hand side of the Weight Calibration Numbers Screen is a list of grain calibration values that range from **C1** through **C11**. These 11 C numbers determine the weight that the display calculates from the data that it records into your regions as you harvest. These numbers have been pre-set by Ag Leader Technology, and you should not change them unless instructed to by Ag Leader Technical Support.
- On the right-hand side of the Weight Calibration Numbers Screen, three more numeric values appear: **M1**, **S1**, and **V1**. The **M1** and **S1** numbers are set specific to the combine model and are used for calibration. Do not change these unless instructed to by Ag LeaderTechnical Support. The **V1** number is the Vibration Calibration number. As with the first two numbers, do not change the **V1** (Vibration Calibration) number unless instructed to by Ag LeaderTechnical Support.

4 **Press New Calibration Button**. To start a new calibration press the **New Calibration** button, located on the bottom of the Weight Calibration Numbers Screen. After the **New Calibration** button is pressed, the EDGE display will apply the new moisture and grain weight calibration from this point forward.

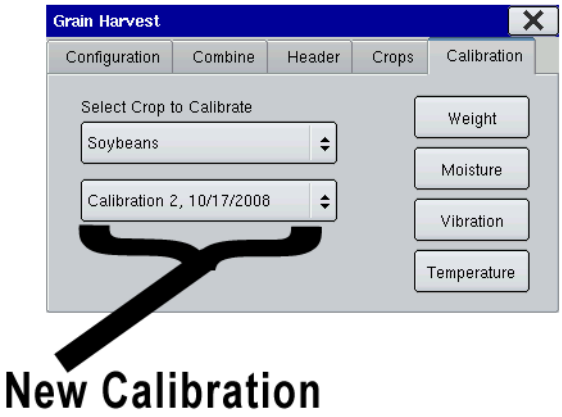
Adding a New Calibration (continued)

5 **Retire Old Calibration**. The Retire Calibration warning screen appears, as shown below. Press the checkmark to retire your old calibration.



	Note: By retiring your old calibration, you will not be able to return to your old calibration, or add data to it.

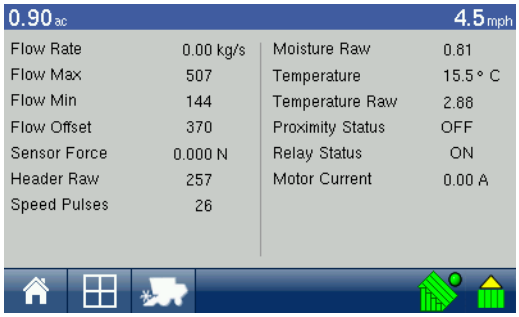
6 **New Calibration Appears.** The new calibration now appears on the Calibration Tab's drop-down menu, as shown below. Your calibrations, past and present, are numbered in the order in which they were created. The calibration's date of creation appears to the right of the name.



7 **Perform New Weight Calibration**. After you have created a new calibration, it is recommended that you perform another Weight Calibration. Refer to *"Grain Weight Calibration" on page 343*

Diagnostics

Pressing the Harvest Display Item on the Harvest Screen summons the Harvest Diagnostics screens that pertain to your configuration (For an example, see illustration at *"Harvest Screen - Active Display Items" on page 322*). Technical support may request that you look at these screens for help in diagnosing a problem. When performing a Harvest operation, you can also access the Harvest Diagnostic screen, as shown below.



The Harvest Diagnostic Tab includes the following information:

- **Flow Rate** - Grain flow rate, shown in kilograms per second.
- **Flow Max, Flow Min** and **Flow Offset** - Raw flow values used for diagnostic purposes.
- **Sensor Force** - Force of grain flow, shown in Newtons.
- **Header Raw** - Raw value of header sensor.
- **Speed Pulses** - Shows the number of ground speed pulses from the combine.
- **Moisture Raw** - Raw value of moisture sensor.
- **Temperature** - Air temperature, shown in Celsius.
- **Temperature Raw** - Raw value of temperature sensor.
- **Proximity Sensor** - Shows if Elevator Mount Unit sensor is covered with grain.
- **Relay Status** - Shows on or off.
- **Motor Current** - Measure of Elevator Mount Unit (EMU) current, shown in amps.

Harvest Diagnostic Notes

- For generalized Diagnostic information, such as memory, display, CAN device and firmware version information, *See "Diagnostics" on page 45.*
- For more information on LED diagnostic states, *See "Module LED Diagnostic States" on page 355.*

Appendix

This Appendix contains the following:

- *"System Diagrams Reference" on page 353*
- *"EDGE File Formats" on page 354*
- *"Module LED Diagnostic States" on page 355*
- *"Company Warranty Statement" on page 356*

System Diagrams Reference

To view detailed system diagrams for various machine configurations, go to the Support Tab of the Ag Leader Web site, which can be referenced via the following URL:

http://www.agleader.com/support.php?Page=manuals/diagrams

	Note: To view and/or print the System diagrams, you will need the Adobe Acrobat or Adobe Reader .pdf file format. The Adobe Reader software comes pre-installed on most personal computers. If Adobe Reader is not installed on your computer the program is available for download at no charge. A link to the Adobe download site is located at the Ag Leader Web site.

EDGE File Formats

Prescription Map File Types	Description
.irx	The *.irx file supports multiple product prescription recommendations in a single file.
.shp, .shx, .dbf (shape file group)	What is commonly called a shape file is actually a collection of three different files. All three of the files are required and must be present on the external storage card for the system to use shape file groups for variable rate product application. A single "shape file" can contain recommendation rates for multiple products.
Boundary and Guideline File Types	**Description**
.iby	Boundary file format. Boundary files are created via the Map Options icon on the Map Screen, or imported to the system from the Grower Management Tab.
System File Types	**Description**
.ibk	Backup files are written to the external storage card by pressing the Create Backup File button at the Console Screen's Memory Tab.
.ilf	Log files are created with the Copy to Card button at the Console Screen's Advanced Tab.
.fw2	Firmware upgrade file for the EDGE display and control modules. Install firmware updates from the external storage card by pressing the Upgrade button on the Console Screen's Memory Tab.
.msf	The .msf (Management Setup File) file format allows the EDGE display to import Grower and Field information from SMS software via a Compact Flash Card.

Module LED Diagnostic States

LED display	Condition Represented
Off	No power
Flashing 1 Hz green	Normal operation
Flashing 1 Hz orange	CAN bus errors detected (error active/passive state)
Steady orange	CAN bus off
Steady red	Hardware or initialization failure
Flashing 1 Hz red	Firmware download in progress
Flashing fast red	Firmware download error

Company Warranty Statement

WARRANTY

Ag Leader Technology will repair or replace at no charge any component of the EDGE system that fails during normal service, while being used in an approved application, within two years of the warranty start date. Warranty is not provided for damage resulting from abuse, neglect, accidents, vandalism, acts of nature, or any causes that are outside of the normal intended use of the EDGE system. Ag Leader Technology shall not be liable for indirect, incidental, or consequential damages to the dealer, end user, or third parties arising from the sale, installation, or use of any Ag Leader Technology product.

PROPRIETARY TECHNOLOGY NOTICE

Ag Leader Technology's EDGE system has patents on its design and operational features. Copying features of this system relating to measurement and calculation of grain flow and weight, organization of field and load data may result in patent infringement.

COPYRIGHT NOTICE

Ag Leader Technology has copyrighted (© 2010) the contents of this manual and the operating program for the EDGE system. No reproductions may be made without first obtaining the consent of Ag Leader Technology.

SERVICE AND SUPPORT

Your EDGE system was designed with simplicity and ease of use in mind. This manual has been provided to help familiarize yourself with the EDGE display and its basic functionality. Setup wizards are implemented where appropriate within the system to further simplify configuration and use.

If you have additional questions or feel that you may be having a problem with your system, call your local Ag Leader Technology dealer or call us directly at the phone number below. If we determine you have a hardware failure, we will ship replacement hardware immediately.

Our Technical Support Department can be reached by phone at 515-232-5363 extension #1 or through email at support@agleader.com.